A Database Publication

THE MICRO USER

Volume 7
Number 7
September 1989
£1.50

Top-selling guide to the BBC Micro, Master, Archimedes series and A3000

BODY BUILDING
Connecting your micro to external devices

FLICK BOOK
Produce entertaining animation quickly

TYPE-IN GAME
Fast action in a fun 3D arcade adventure

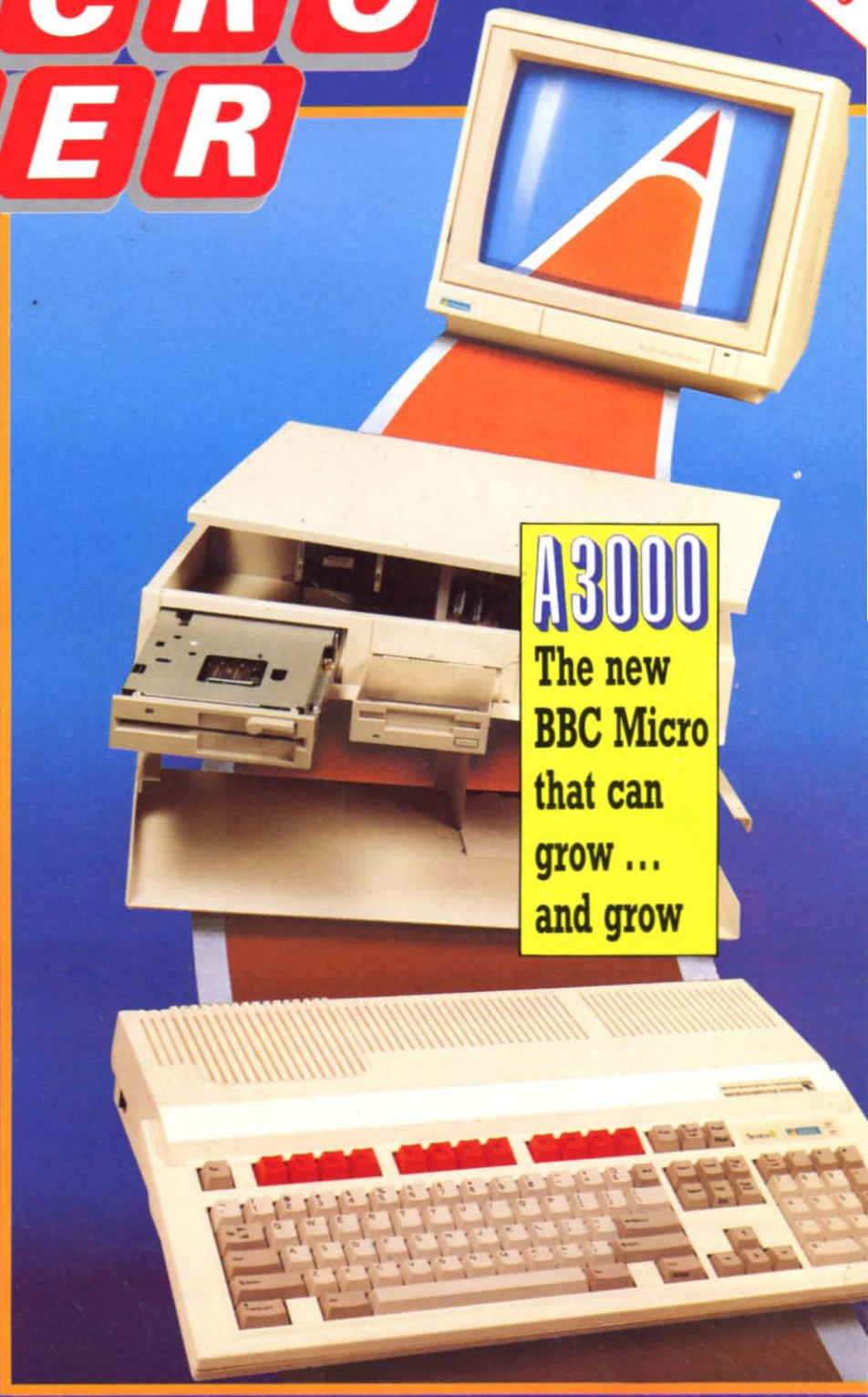
ON DISPLAY
Examine every area of your micro's memory

SELECTION
Make colourful menus for your own programs

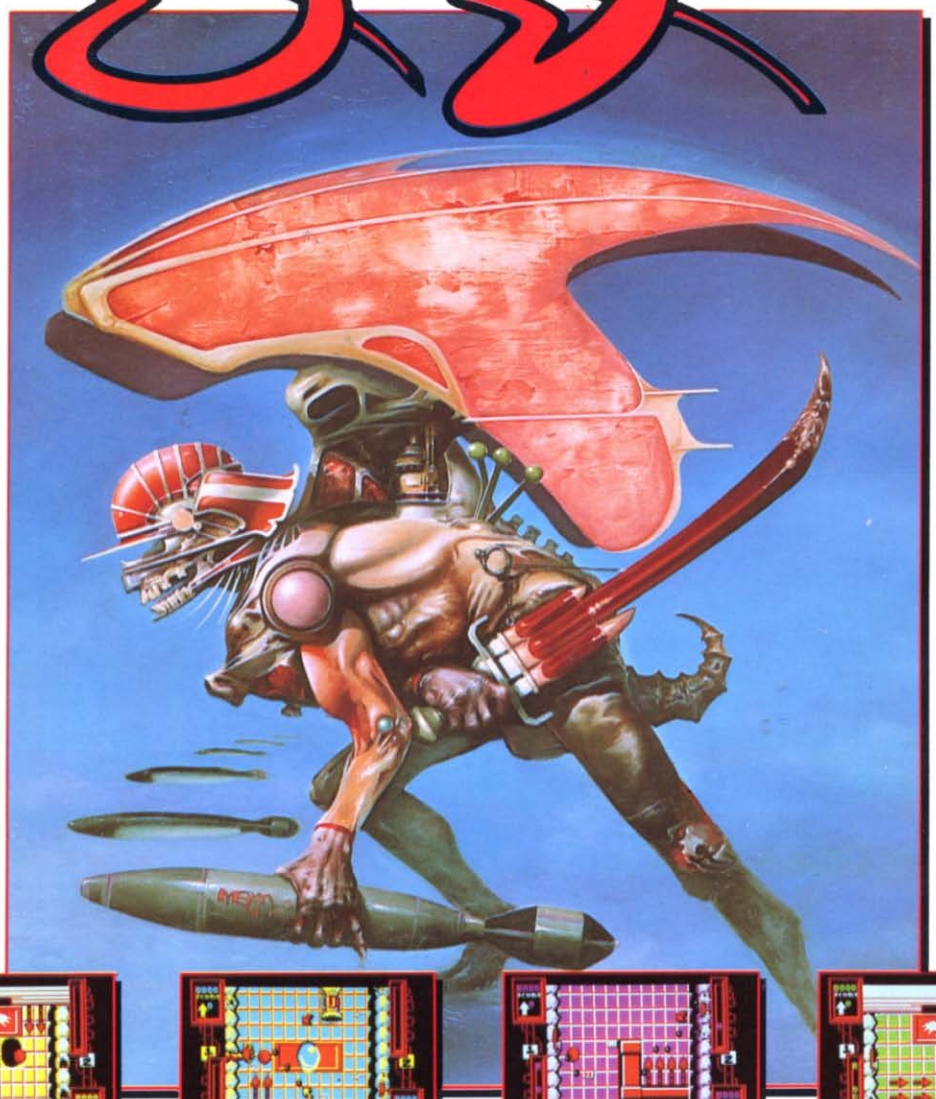
SIMULATION
Management game: Become a beekeeper

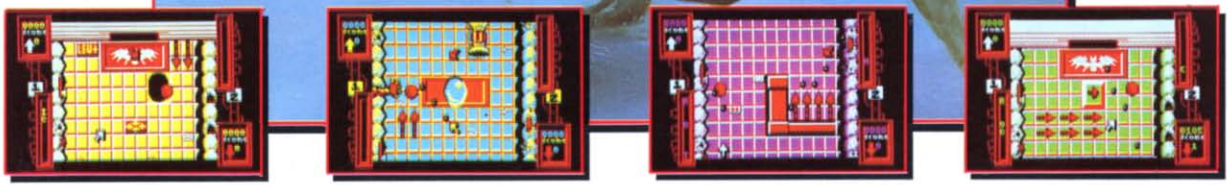
REVIEWS
- Spellcheck
- KeyWord
- TechnoCAD
- Geoscan
- Turtle Worlds
- Stretch

. . . plus all the latest games



BALLISTIX





BALLISTIX - It's a whole new ball game!

Sick of silly old soccer? Tired of pathetic pinball? Then you need a dose of BALLISTIX - the fastest, wackiest, toughest computer ball game yet to appear - and a No. 1 smash hit on the Atari ST and Commodore Amiga computers. BALLISTIX just explodes with excitement, puzzles and an amazing 60 different screens of frenetic action.

BALLISTIX is incredibly flexible too. You can play against the computer or another player, can define where the balls are fired and their direction and can rack up bonuses that will get you extra goals, all to the accompaniment of a crowd that applauds your every goal. It's tough, fast, challenging and incredibly competitive.

BBC Micro Cassette	£9.95	Acorn Electron Cassette	£9.95
BBC Micro 5¼" Disc	£11.95	BBC Master Compact 3½" Disc	£14.95

(Compatible with the BBC B, B+ and Master Series computers)

Please make cheques payable to "Superior Software Ltd".

(The screen pictures show the BBC Micro version of the game.)

GAME FEATURES

The aim of the game is simple enough: score more goals than your opponent to win a match. However there are lots and lots of extra features to contend with as you advance from screen to screen, for example:

- RIDGES to get the balls over.
- SPLITTERS produce extra balls.
- BUMPERS bounce balls all over.
- MAGNETS divert balls from you.
- HOLES for balls to drop down.
- TUNNELS hide balls from view.
- RED ARROWS accelerate balls.
- OIL SLICKS stop balls dead.

SUPERIOR SOFTWARE Limited

ACORNSOFT

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)

Dept BL3, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone:(0532) 459453

Available from WHSMITH and all major dealers

ACCESS VISA

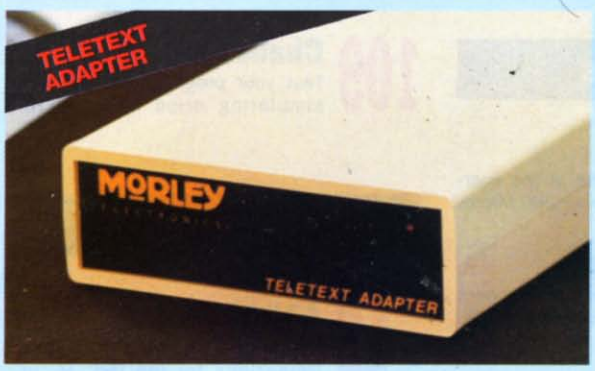
24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

(This does not affect your statutory rights)

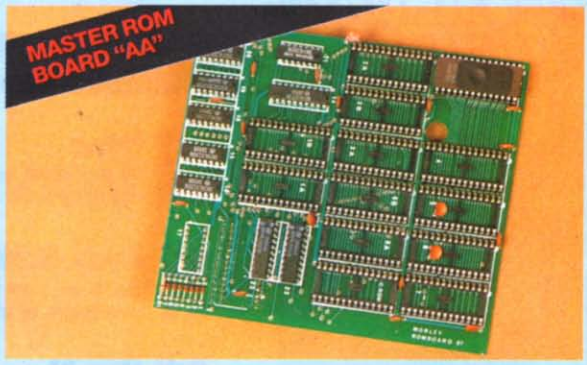
MORLEY ELECTRONICS



TURN YOUR BBC INTO A TELETEXT RECEIVER

- State-of-the-art unit.
- ATS (Advanced Teletext Software) supplied on ROM.
- Free Telesoftware. Download and use high quality software.
- Free use of automatically updated massive database.
- Digital tuning – no manual controls.
- Comprehensive user guide.
- Allows standard Teletext pages to be saved and printed.
- World's biggest selling adapter.

BBC/Master Compact	£104 £120
RML Nimbus Optional PSU	£104.20 £9.50



THE ULTIMATE ADD-ON FOR ALL SERIOUS MASTER USERS

- No more need to switch your computer off to insert a cartridge containing a required ROM.
- With 2 cartridges and a ROM board, a staggering 32 ROM images installed and accessible at any time.
- Allows up to an additional 8x16k and 4x32k ROMS installed inside your computer still leaving your cartridge slots free.
- Master control ROM which includes a clever file transfer program allowing files to be transferred between DFS and ADFS formats or vice versa.

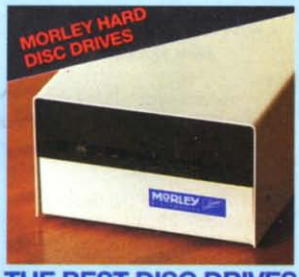
£40

- Attractive state-of-the-art unit.
- Totally software controlled. Eprom creator utility also available.
- Programmes 27128/2764/27256 Eproms: 12 and 21 volt.
- Includes full ROM management software with numerous features.

£30

- Fast to install and operate.
- User-friendly menu driven software.
- Built-in features include:
  - Autosaves computer's entire memory.
  - Freeze program at any point.
  - Screen dump (any mode) to printer or disc.
  - Allows most protected software to be backed up including disc to tape and tape to disc.
  - Extensive range of useful FX calls.

£30



THE BEST DISC DRIVES AT AFFORDABLE PRICES

- Completely compatible with BBCs, B+s and Masters fitted with ADFS.
- High output switched mode power supply.
- Free utility disc incl. Format; Verify; Archive and Park.
- Whisper quiet internal fan.

20meg £370 30meg £420
40meg £500

LIMITED STOCK
1Mg RAM Discs £150.00

- The full range of Care Master Cartridges:

Dual 2 x 16k	£9.00
Quad 4 x 16k	£14.00
Duet 2 x 32k	£12.00
32k NON VOLATILE RAM Cartridge (ideal for Spellmaster Dictionary)	£33

SOFTWARE ... SOFTWARE ... SOFTWARE ...

M/B SOFTWARE

- DESIGN 7+. Commonly accepted as the brand leader in Teletext screen programs **£8.60**
- DESFAX. Design and run your own Teletext information/ display system **£17.40**
- MASTERFAX. Enhanced Desfax program on the Master or compact **£26.00**
- MASTERCOPY. A must for any Master or Compact owner. Allows simple, intelligent file transfer between ADFS and DFS systems. You'll wonder how you managed without it **£11.20**

MORLEY SOFTWARE

- Teletext utility disc. Includes auto downloader, screendump, etc. **£5.20**
- Eprom utility disc. Put all your favourite routines into sideways ROM, both basic and machine code **£5.20**

COMPUTER CONCEPTS

Spellmaster	£51.30
Mega 3	£85.00
Interword	£49.00
Interbase	£60.00
Intersheet	£49.00

Plus full range.

CONSUMABLES

27128 Blank Eproms	£4.20
5¼ Floppy Discs x 10	£5.00
3½ Floppy Discs "	£10.00

TO ORDER...

CARRIAGE: £1 on all orders. £3 on larger items (adapters).

VAT: UK customers please add 15% to cost incl. carriage.

BY POST: Enclose cheque made payable to MORLEY ELECTRONICS LTD.

BY PHONE: By quoting your ACCESS or VISA card number.

Goods usually despatched by return.

Government and Education orders welcome.

The Morley range includes a full range of Amstrad/IBM peripherals. Telephone for details.

ALSO AVAILABLE FROM ALL GOOD ACORN DEALERS

Morley House, Off Norham Road, North Shields, Tyne & Wear NE29 7TY. Tel: (091) 257 6355. Fax: (091) 257 6373

THE MICRO USER

Managing Editor
Derek Meakin

Features Editor
Peter Davidson

Deputy Features Editor
Steve Turnbull

Production Editor
Peter Glover

News Editor
Don Lewis

Technical Editor
Mike Cook

Promotions Editor
Christopher Payne

Reviews Coordinator
Pam Turnbull

Advertisement Manager
John Snowden

Advertising Sales
Peter Babbage, Gail Blincow
Richard Gingell, Jane Conway

Tel: 0625 878888 (All depts.)
051-357 2961 (Subs.)
Telecom Gold: 72:MAG001
Telex: 9312188888 DB
Prestel Mailbox: 614568383
Fax: 0625 879966

Published by:
Database Publications Ltd,
Europa House, Adlington Park,
Adlington, Macclesfield SK10 4NP.

ABC 40,376 Jan-June 1988
ISSN 0265-4040

The Micro User welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

© 1989 Database Publications Ltd. No material may be reproduced in whole or in part without written permission. While every care is taken, the publishers cannot be held legally responsible for any errors in articles, listings or advertisements.

The Micro User is an independent publication and neither the BBC nor Acorn Computers Ltd are responsible for any of the articles in this issue or for any of the opinions expressed.

News trade distribution: Diamond Europress Sales & Distribution, Unit 1, Burgess Road, Ivyhouse Lane, Hastings, East Sussex TN35 4NR. Tel: 0424 430422.

Database Publications is a division of Europress Ltd

Regulars

7 News
All the latest events in the ever-changing world of your BBC Micro.

23 Body Building
We show how you can connect your micro to electronic gadgets.

36 Hac Man
A wealth of useful hints and news from our resident games expert.

57 Problem Solved
A helping hand with some of those mind-testing hardware problems.

60 Mad Hatter
Our expert looks at adventure games – old, new and revamped.

73 Ceefax Guide
What's coming this month on the telesoftware pages of BBC TV.

111 Letters
The chance to get your news, views, moans and name into print.

Series

21 Last Ninja
All the help and maps you need to complete levels three and four.

41 Wimps
We add the final routines to the window-based accounts program.

51 Sprites
Expanding routines to produce even better collision detection.

109 Challenge
Test your programming skills by simulating drips on a micro.

Features

18 A3000
We take a look at the latest expansions for the BBC Micro.

106 Animation
For fun or education: A superb routine to create flick books.

Game

49 Crystal Sea
Can you avoid the deadly octopi in this fast action-packed game?

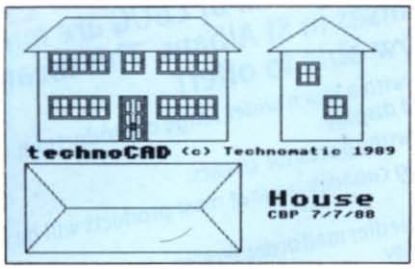
Utilities

27 Dumper
A useful routine to display the contents of ANY area of memory.

81 Menus
Make selection easy with this routine for your own programs.

Reviews

31 Software Scene
Our reviewers give the very latest games releases the once over.



45 TechnoCad
A powerful draughting tool for the Master is put to through its paces.

99 Spellcheck
We see how users of PipeDream can check out their spellings.

101 Keyword
A review of the first word finding utility for the Archimedes series.

Education

63 Update
Up-to-the-minute news of the BBC Micro in the world of education.

66 Education Reviews
Looking at the best in software for the BBC Micro series in schools.

75 Beehive ✳
Our latest simulation game takes all the stings out of beekeeping.

Cover story

A3000 – The future

On Page 18 we take a look at how you can expand the new 32 bit BBC Micro and preview what's in the pipeline. There's disc drives – hard and floppy – and podules all contained within one tidy unit.

18

Crystal Sea

Use your droid to collect the diamonds in this action-packed 3D arcade game.

49

Animation

Children have created simple animation using flickbooks for years. But to make a good one could take hours. Now you can create one easily by using our useful routines. Not only are they fun – they're educational too.

106

MICRO USER CLASSIFIEDS

The best bargains in the world of the BBC Micro come from fellow readers of *The Micro User*. Turn to **Page 104** to find just what you're looking for – from cheap modems to complete computer systems.

For full details of how to use the Checksums, see the article on Page 48 of the February 1989 issue of *The Micro User*.

The Type-it-in symbol indicates that the feature contains at least one full length listing for you to key in on your micro.

Next month in THE MICRO USER

ORBITS
Simulate spacial movement

WIPE
Clear sideways ram easily

DTP
Top products reviewed

EDUCATION
Producing a newspaper

BEEBUG OPEN DAY

We're moving

On Monday August 14th, BEEBUG are moving to larger premises in St Albans. This means that we are now able to offer!

Larger showroom with a much wider range of products on demonstration and display.

Customer car park with spaces for 10 cars.

Greater stockholding capacity, so that most products will be in stock all the time.

More efficient and speedier mail order service, with most orders going out the same day.

Conference room facility enabling us to hold training seminars.

Fully equipped workshop/testroom enabling us to provide speedy repairs.

From August 14th please address all correspondence to our new address:
BEEBUG Ltd, 117 Hatfield Road, St Albans, Herts. AL1 4JS.
Our telephone numbers will remain the same 0727 40303, Fax: 0727 60263

To celebrate the move, we are holding our OPEN DAY on Sunday, September 10th from 10am to 5pm. Everyone is welcome.

- This will be your opportunity to meet the editorial staff and contributors to BEEBUG and RISC User.
- The whole premises will be open with displays and demonstrations of leading BBC Micro and Archimedes products.
- FREE £50 BEEBUG Gift Voucher, donated by Mercantile Credit, to the first 25 accepted finance applications completed on the Open Day.
- Representatives from Acorn will be on hand to answer your questions. Computer Concepts, Minerva, Clares and others will also be demonstrating their latest products.
- Demonstrations of the latest in Desk Top Publishing, Scanners, Communications, Studio 24 with Midi, and much more.
- Many items at specially reduced prices.
- The BEEBUG technical team will be available to answer your technical questions.
- FREE draw (entry form below) with a prize of an Archimedes 410 Colour System donated by Mercantile Credit. The winner will be announced at the Open Day.
- Refreshments will be available.

How to find 117 Hatfield Road:
By Car – St Albans is easily reached from A1 A5 A6 M1 and M25.
By Train – We are 10 minutes walk from St Albans City station from King's Cross, St Pancras, and Bedford in the north.

FREE DRAW ENTRY FORM

Name _____

Address _____

_____

Mem No _____ if BEEBUG/RISC USER member

Age (if under 18) _____

I understand that this coupon will be passed to Mercantile Credit Ltd who will be adjudicating the entries.

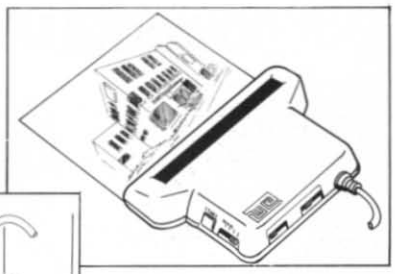
Staff of BEEBUG Ltd and Mercantile Credit Ltd are not eligible for the draw.

Only one entry per household.

Post to: BEEBUG Ltd, Dolphin Place, Holywell Hill, St Albans, Herts. AL1 1EX.

NEWS beat

Hi-res image scanner for the BBC Micro



THE first hand-held, high resolution image scanner for the BBC Micro has been launched by Watford Electronics (0923 37774).

Using the 105mm wide scanner, photographs, drawings and other documents can be scanned at 100 or 200 dots per inch.

Dithering simulates grey scale reproduction and the firmware supplied allows images to be read directly into Watford's Wapping Editor DTP package for incorporation into documents.

"It is Watford's long experience of producing peripherals and software for the BBC Micro and making the most of the available hardware that has enabled us to be the first with a hand held scanner of this kind", said Watford boss Nazir Jessa.

The peripheral is easily connected directly to the 1MHz bus with controlling software in rom and costs £135.

Also new from Watford is its Archi Hand Scanner system for the Archimedes. With the interface contained on a single width backplane expansion card, this high resolution image scanner includes edge detection to convert solid objects into outline images, selective directional copying, X and Y flip, colour tinting, scaling and adjustment of aspect ratios.

Scanned images can be saved as sprite files or transferred directly to other Risc OS applications. Resolution is switchable from 100 to 400 dpi and three greyscale modes use different dither patterns to represent up to 16 shades of grey. Price, £149.

The new Watford graphics tablet is designed to enhance the powerful drawing and design capabilities of the Archimedes.

The Archie Graphpad connects to the serial port and intercepts the mouse system calls, enabling it to be used with virtually all mouse-operated software without modification. Arthur and Risc OS are fully supported.

It costs £259 complete with all leads and software.

Arc's OS is given a boost

AN extension to the Archimedes operating system, Arthur 1.2 and Risc OS, has been announced by Dabs Press (061-776 8423).

Instigator contains over 80 star commands and it is claimed that using the module makes new operations possible, simplifies the use of existing features and gives users a claimed unprecedented control over the machine.

Main features include single command windows, command archiving, file finder, colour palette utilities, file compressor, full line editor and internal clipboard.

Instigator costs £49.95.

NO GO FOR PIRATES

GAMES will soon bear a new symbol as a warning against copying.

Taking the next step in its battle with piracy, FAST, the Federation Against Software Theft, is hoping to persuade software houses to use a common warning symbol.

Liverpool-based Psygnosis has offered to design the symbol free of charge. It will feature the internationally recognised red circle with a diagonal slash and may include a picture of a pirate.

Packs for the farmers

FARM management consultant Dixon and Dixon (091-285 3042) has added two new packages to its range of practical software for Acorn computers.

Milkman and Newsman have been written to handle milk and newspaper deliveries. Both systems cope with up to 2,000 customers on one floppy disc or a seemingly unlimited number on Winchester with up to 200 stock items and up to 26 rounds.

A package of software, Archimedes 310, printer with receipts and software support costs £2,070. Software and support alone cost £460.

Now available for the Archimedes are accounts package Farmcash for £230, database Fieldfile for £172 plus budget and planning package Farm Planner for £207.

Mr Music

ACORN Computers has appointed Simon Lovesey as marketing manager for its home, music and hobby sectors.

His brief is to build on Acorn's position in the home markets and capitalise on the company's hold in the field of education.

Before going to Acorn, Lovesey had been with Amstrad as product marketing manager.

The RISC USER ARCHIMEDES TOOLBOX

The Full Screen Disc Sector Editor

A powerful utility for the Archimedes offering:

MEMORY SEARCH
a full screen editor which enables you to find a sequence of bytes, words or characters quickly and easily.

MEMORY EDITOR
with the help of this you can examine and alter memory in either hex or ASCII mode.

DISASSEMBLER
this command displays the contents of memory as ARM instructions including floating point and co-processor mnemonics.

DISC SECTOR EDITOR
a most helpful command for examining and changing disc contents directly. Ideal for repairing corrupted discs and recovering lost files.

PLUS MANY OTHER POWERFUL COMMANDS INCLUDING:

- FILE FIND
- FILE COMPARE
- FILE GO TO
- MEMORY DUMP
- CATALL

JUST ONE OF MANY...

This is just one of the many useful programs that subscribers have received free in RISC User magazine. Each issue is crammed full of:

- hints and tips on programming the ARC
- handy utilities
- smart graphical routines
- useful applications
- tutorial articles on getting the most out of your Archimedes
- plus reviews of all the latest for your machine.

SPECIAL OFFER

Subscribe NOW to RISC User and you can get the ARCHIMEDES TOOLBOX disc at the members price of only £3.50 + 60p p&p
The TOOLBOX disc is available to non-members for **£15.00 + 60p p&p**

OTHER BENEFITS...

When you subscribe to RISC USER you get 10 magazines a year, dedicated solely to the Archimedes and full of new ideas, stimulating articles and programs, mailed to your home plus:

- free membership to our user group,
- free help from our technical support team,
- showroom with friendly knowledgeable staff,
- swift mail-order service,
- significant discounts on our own software range and 5% discount on a wide range of other products,
- trade-in service to upgrade your system

RECENT ITEMS MISSED BY NON-SUBSCRIBERS

- Multi-Tasking with RISC OS
- Acorn's Ray Tracer
- Using the RISC OS Text Editor
- Real Time Image Wrapping
- ADFS File Find Utility
- The RISC OS Desktop
- Animation Techniques
- Fractal Scenery
- Using the ARM Assembler
- Movie Maker Animation
- Writing ARM Utilities
- Sprite Manager Utility
- Building-up Procedure Libraries

Order Form

Please supply the Archimedes TOOLBOX disc and documentation for the members' price of £3.50 + 60p p&p: ☐
non-members' price of £15.00 + 60p p&p. ☐
I would like to subscribe to RISC USER Magazine and Support Group at £14.50 (UK). ☐

I enclose a cheque for £_____ *(all cheques must be in pounds sterling, drawn on a UK bank)* or,
Please debit my Access/Visa account No. _____
Expiry Date____/____/ Signature_____
Name_____
Address_____
_____
Mem No (if member)_____ MU9

RISC USER SUBSCRIPTION RATES (1 YEAR)

£14.50	UK, BFPO, Ch.I.
£20.00	Rest of Europe & Eire
£25.00	Middle East
£27.00	America & Africa
£29.00	Elsewhere

Send to:

BEEBUG LTD 117 Hatfield Road, St Albans, Herts. AL1 4JS. Tel. St. Albans (0727) 40303, FAX (0727) 60263,

NEWS beat

Trickier courses

GOLF fans who mastered the two original courses in The Fourth Dimension's Holed Out package can now pit their skills against two more fiendishly devised 18 hole courses.

Fourth Dimension (0742 700661) has designed them to test even the most experienced player and they come complete with detailed maps.

"We've had a lot of requests for extra courses", said Steve Botterill of The Fourth Dimension, "and these are a lot trickier than the original holes and require a dab hand to get round anywhere near par".

Called Holed Out Extra Courses, Volumes 1 and 2, they come cheaper than the original. BBC Micro cassette costs £9.95, disc £11.95, Master Compact disc £12.95 and Archimedes £16.95.

Still cheating . .

A CHEAT for Exile is star of the latest volume of Cheat It Again, Joe. It allows firing streams of grenades, a protection suit and all guns at full power.

Following the success of the previous three volumes produced by Impact, number four in the series comes from Mark Gidley of Zentrix Software (0933 55273). Due for release on September I, it will cost £4.99 on BBC/Master disc.

Arc in art duo

A NEW partnership has hit the theatrical world of the South West, and it looks like an act that is set for a national tour. Now treading the boards together in the traditionally low-tech world of the theatre are the Archimedes and Atelier, the art package from Minerva.

There was no need for first night nerves when Exeter-based Minerva (0392 410137) raised the curtain on its latest idea at Exeter's Northcott Theatre.

Archimedes and Atelier showed a colourful moving and talking programme of forthcoming events to theatre goers on a 25 inch colour monitor in the foyer.

"I can now see the possibility of a whole new market opening up for the Archimedes/Atelier duo in regional theatres", said Minerva's Nova Fisher. "This has exciting new possibilities".

The versatility of Atelier was shown recently by sales executive with Minerva, Pat Cleaver who used it to draw a full colour copy of Turner's masterpiece The Fighting Temeraire.

Atelier can distort and rotate shapes, wrap pictures round a wine glass or bottle and improve digitised pictures. It costs £99.95.

New look at soccer

SUPERIOR Software's top author Peter Scott has combined the immediate fun of an arcade game with the brainwork of a management game to produce one of the Leeds-based company's latest offerings, Superior Soccer.

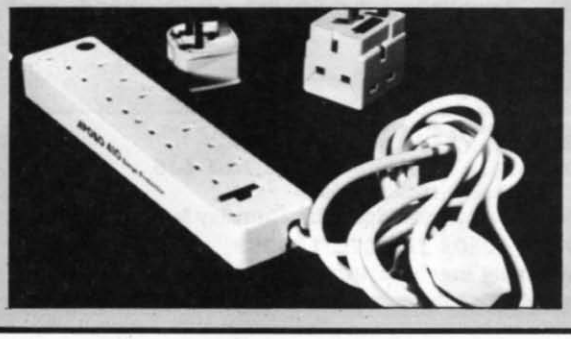
Word from Superior boss Steve Hanson is that he has ended up with the best of both worlds. Superior Soccer will cost £9.95 on BBC Micro cassette, £11.95 disc and £14.95 Master compact.

For the same prices Quiz Challenge is a quiz game designed specially for the computer rather than a ported version of a board or TV game. It is due for either autumn or Christmas release by Superior.

Completing the latest Superior packages will be Play It Again Sam 11 and 12. Despite rumours that Superior would stop at Sam 10, the Hanson brothers have decided to continue with this winning formula of compilations.

It will continue to be stocked in force by W.H.Smith where the full range looks good on the shelves and sells well.

"We've not actually decided on which games will be included in these latest two versions", said Steve Hanson. "I'm sure a lot of people will be able to guess some of the likely titles, but they will have to wait for confirmation until nearer the release date in the autumn".



Blunt those spikes

WHEN mains interference strikes, fate decrees that it will always be when you are nearing your best games score or have a lot of data to be corrupted.

Apollo Electronic Products (04858 8156) has launched a range of products designed to combat the mains "spikes" which can be caused by home equipment such as washing machines, power tools and microwave ovens.

Its suppressors include a plug unit for £12.50, a three-way adaptor at £16, and a four gang strip adaptor at £35. All are capable of absorbing a spike of 4,500 amps/225 joules.

ARCHIMEDES SPECIALISTS

BEEBUG offers you:

Technical Support Department
We don't lose interest as soon as you've made your purchase. You can always telephone our Technical Support Department or Showroom for some friendly and impartial advice.

Archimedes Magazine - RISC USER
Subscription is just £14.50 a year (UK), for this 56 page magazine packed full of useful information, programs, news, hints and tips etc.

Repairs and Service
If things do go wrong, you can be confident of our repair and service department. We will get your computer repaired as soon as possible, and return it to you free of charge, for a full year from the date of purchase.

Price
Our prices are competitive, but if you see a better current deal from another Acorn dealer, we will be pleased to match it. In that way you can be sure of the best price as well as outstanding support and service.

Speedy Service
We have a showroom in St Albans where you can see and try any of the systems. They are always on display and in stock. Our mail order service is also very efficient, with over 80% of orders going out the same day. 48 hour delivery charges on a complete system are just £7 and 24 hour delivery £11.50.

Payment and Finance
We accept cheques, Connect, Access and Visa, and are able to offer various credit options including 0% finance over 9 months or 13.75% flat rate (typical APR 28%) over 12, 24 or 36 months.

Acorn's NEW A3000 Computer

ACORN A3000 SERIES		
0255G	A3000 Entry System	649.00
0256G	A3000 Colour System	869.00
ARCHIMEDES 300 SERIES		
0193G	310 Entry System	899.00
0195G	310 Colour System	1119.00
0257G	310M Entry System	959.00
0259G	310M Colour System	1179.00
ARCHIMEDES 400 SERIES		
0260G	410/1 Entry System	1199.00
0261G	410/1 Colour System	1419.00
0262G	420/1 Entry System	1699.00
0264G	420/1 Colour System	1919.00
0275G	440/1 Entry System	2499.00
0276G	440/1 Colour System	2719.00
0263G	440 Entry System	1929.00
0265G	440 Colour System	2149.00

PRICES EXCLUDE V.A.T.

Archimedes Price Guarantee

We will match any current price or offer available from any other reputable Official Acorn Dealer.

MEMBERS SPECIAL OFFERS - WHEN BUYING AN ARCHIMEDES SYSTEM WE WILL GIVE YOU ABSOLUTELY FREE:

With a 310 • PC Emulator, Printer Lead, Ten 3.5" discs & Lockable disc box

With a 410/1 420/1 or 440 • PC Emulator, 1st Word Plus, Printer Lead, Ten 3.5" discs & Lockable disc box

With a 440/1 • PC Emulator, 1st Word Plus, Software Developer's Toolbox, Printer Lead, Ten 3.5" discs & Lockable disc box

OR

A choice of goods up to 10 % of the value of your Archimedes.

Please enquire for details of member's offers with 0% finance.

FURTHER DETAILS

Please telephone for more information on:

- 0% Finance over 9 months
- 12/24/36 Month Finance
- Trade-ins for Archimedes

Finance arranged within 48 hours and all orders for Archimedes despatched within 24 hours.

BEEBUG Ltd

117 Hatfield Road, St. Albans, Herts., AL1 4JS

Adjacent to the Methodist Church

Showroom open 9.00 am - 5.30 pm Mon - Sat Thursday late 'til 8pm

☎ (0727) 40303 Fax (0727) 60263

(Answering machine from 5pm)

NEWS beat

Ace line in graphics

ACE Computing (0223 322559) has launched a Risc OS version of its popular 3D graphics package Euclid for the Archimedes.

Designed to take full advantage of Risc OS, Euclid is both multi-tasking and multi-editing. With ease of use in mind, features of the program such as windows, menus and the help system have been designed in line with other Risc OS applications.

Icons are used extensively and certain key elements such as boxes, cylinders, spheres and cones can now be constructed automatically.

"We believe that the future of the Archimedes lies with Risc OS and are committed to developing quality software which exploits its potential to the full", said Ace Computing's Tony Cheal.

Risc OS Euclid costs £70. Registered users of Euclid can upgrade for £25.

More Unix

SETTING its sights on the Unix market, Acorn says it will be able to offer X/Open and Posix compliance by the end of the year.

Its escalating assault on Unix follows the launch of its R140 workstation at the end of last year. In the computer marketplace it has been pushing four key areas, office automation, networking, graphics and Unix/Dos.

. . and Minix

THE Minix Centre (095 389 345) intends to bring out an Archimedes version of its Unix clone Minix later this year.

"Small enough to be understandable yet large enough to be realistic", is the claim for Minix, a Unix lookalike written by Andrew Tanenbaum. Price of the Archimedes Minix has not yet been fixed, but current versions vary from £85 to £120.

Micro goes on safari

THE BBC Micro is well known for its robustness and reliability but that was put to the ultimate test recently when the youngsters of Operation Raleigh took computers with them on safari in Kenya.

Acorn donated 12 machines to the scheme which allows young people to go on expeditions in remote parts of the world to help with collecting important experiment data.

Used for report preparation, spreadsheet analysis and statistics in a field laboratory at Lake Baringo, the micros coped well with a hostile environment.

Operation Raleigh also took a computer when exploring Indonesia in very wet and humid conditions.

"The BBC Micros have been indispensable to Operation Raleigh, enabling us to carry out many experiments that would have been impossible without them. No expedition goes without one", said its computer coordinator David Hopkins.

Hi-tech targets

A WIDE variety of scientific, medical, industrial and signal processing applications are the target of a new analogue to digital converter from Wild Vision (091-281 8481).

Developed to match the speed of the Risc-based Archimedes, the ADC 1208 is capable of up to 166,000 samples a second and 12 bit resolution.

The expansion card is fully programmable with software selection of input channel, sampling rate and digital I/O mode. To allow communication with other digitally-controlled devices, the ADC 1208 also provides digital input/output facilities, pin compatible with the BBC Micro user port. This allows the analogue to digital conversion to be synchronised to external events.

Two programmable 16 bit timers are provided to set the sampling rate, initiated directly by the Archimedes or via interrupt requests.

The ADC 1208 costs £569 supplied with user manual and programming instructions.

Trade paper changes hands

THE Europress Group has become joint owner of Specialist Retail Press, publisher of Computer Trade Weekly. It is running CTW in partnership with SRP's present managing director, Tom Stock.

Europress, the parent company of Database Publications, Database Exhibitions, Database Software and Mandarin Software, has joined with Stock to buy SRP from the Spectrum Group plc.

Stock continues as managing director and has been joined on the board by Europress chairman Derek Meakin, managing director Michael Meakin and commercial director David Hirst. CTW remains an independent publication keeping its current location and staff.

"Tom Stock and his team have done a most professional job in building CTW into what it is today, an indispensable part of the leisure computing industry in Britain", said Derek Meakin.

"We are delighted to become associated with this successful publication and we will do all we can to support its continued progress. In particular, the Europress Group's detailed knowledge of the European marketplace will now be available to CTW.

"With our backing, CTW should be able to play a vital role in helping UK companies build a marketing bridgehead throughout the Community in the run up to 1992 with considerable benefits to all".

Tom Stock said: "I have long felt that CTW was the poor relation in the Spectrum Group. This was not deliberate but it is understandable for the group to concentrate its resources on core activities rather than on the development of a satellite publishing company".

The chairman of Spectrum, Alastair MacGillvray, said: "We believe that a company with the expertise and reputation of Europress can actively take CTW and SRP into the next league. On a horses for courses basis, we believe that Europress can do a better job for SRP than Spectrum".

NEWS beat

MicroLink moves on

MAJOR changes are being planned for MicroLink, the rapidly growing electronic mail service. It will leave Telecom Gold and enter into a partnership with Istel Inet, the new telecommunications giant.

Istel Inet is a partnership of two major international names in the field of data communications, Istel and Bell Canada Enterprises.

"We have long been faced with restrictions that have prevented us developing the service in the way we know our subscribers would like", said MicroLink chairman Derek Meakin. "We feel that the time has come to break away from Telecom Gold and open new doors.

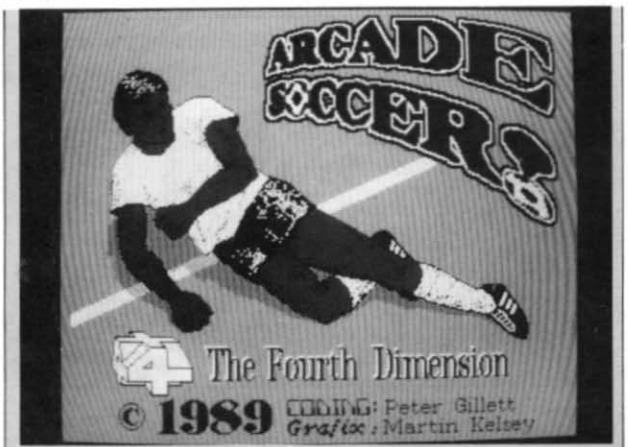
"The result will be a considerable expansion of services available to anyone with a computer, a modem and a telephone".

Many of the present facilities offered by MicroLink will be improved and the new service will also include news, sport and weather, a comprehensive financial section plus on-line shopping. Computer conferencing, a service long requested by MicroLink subscribers, will also be introduced.

DTP pack scales fonts

THE facility to scale fonts in real time is a unique new feature of Acorn's latest package Desktop Publisher. It allows users to select the size of typeface in the final document without being bound by the options that the supplier has made available or limitations imposed by the printer.

Designed to exploit the performance of the company's Risc-based Archimedes machines, Desktop Publisher has already attracted several hundred orders. It costs £171.



ACCENT ON ACTION

SLIDING tackles, diving goalies, corners and throw-ins are just some of the features of Arcade Soccer, the latest BBC offering from The Fourth Dimension (0742 700661). An Archimedes version is also to be launched.

"This game will fill a real gap in the market as there are no action football games available at present for the BBC", said Dimension's Steve Botterill. "It's a game that I have wanted for some time, so we've put everything into it that we wanted in a soccer game ourselves".

Goal kicks, eight directional scrolling, one to 16 player options and full keyboard or joystick controls are also featured. BBC Micro cassette costs £9.95, BBC/Master disc, £12.95, Master Compact £13.95 and the price of the Archimedes version will be £19.95.

PipeDream on Risc OS

COLTON Software (0954 211472) has developed a Risc OS version of PipeDream.

With PipeDream 3 it aims to break down the barriers between word processor, spreadsheet and database. Text and numbers can be combined to build up pages on screen exactly as they are to be printed out.

All word processing, spreadsheet and database work coexists in the same windows.

New features include a facility to load many documents at once, built-in 93,000 spellchecker, automatic loading and saving of several new filetypes, natural, minimal, interruptible background recalculation and slot protection.

The user interface has been redesigned from scratch to conform completely to Risc OS guidelines. PipeDream 3 costs £169. Upgrade prices are to be sent to registered users direct from Colton.

IBM software connection

MORLEY Electronics (091-257 6355) has produced an upgrade for its Teletext adaptor software which allows IBM software to be downloaded with a BBC Micro. Any users with ATS rom version numbers lower than v3 can get the upgrade for £9.

Medicine and the micro

NEWS that a Nottingham anaesthetist plans to use a BBC Micro to help administer drugs in the operating theatre has prompted a warning and some interesting statistics from Martyn Thomas, chairman of BCS Safety Critical Systems Group (01-637 0471).

After reading the report in July's issue of *The Micro User*, he says: "It is very difficult to develop computer systems so that they can be shown to be adequately safe. It is important to recognise that it is rarely, if ever, possible to test a computer system for sufficient time that you can be confident that it is safe enough.

"If you want to show to 99 per cent confidence that a medical system will fail no more often than once every 1,000 hours, then you need to test the system under the exact conditions of use for at least 7,000 hours without finding errors.

"At 40 hours' testing per week this would take more than three years, yet one failure in 1,000 hours could kill or injure a patient every six months".

He advises anyone wanting to use computers in safety applications to read Guidelines on the Use of Programmable Electronic Systems published by the Health and Safety Executive.

Art with impact

IMPACT Software (0742 769950) has launched a new art package for the BBC Micro called The Art Studio.

It works in Modes 4 and 5 and features many easy to use functions including zoom, copy, move, paint with 100 brush sizes and rubber.

BBC Micro cassette costs £9.95 and disc £12.95

BEEBUG

Your Chance To Join The Team

In 1982 when Acorn announced the release of the BBC Micro, Beebug was formed to provide a magazine and user group for the new computer. Since then Beebug has continued to grow and provide new services.

Today, as well as publishing Beebug for users of the BBC Micro, Master and Compact, we publish RISC User, the leading magazine exclusively for Archimedes users.

We also have a large showroom and Mail Order operation, supplying goods throughout the world all backed up by our Technical Support Department. Beebugsoft, our software division, provide an exciting range of products for the BBC, Master and Archimedes.

We have just moved into larger premises and therefore have some interesting staff vacancies.

SALES ASSISTANT

Our new showroom provides an ideal setting for the demonstration of computer equipment and peripherals. As well as being a leading Acorn Archimedes Qualified Dealer, Beebug is also an appointed Advanced System Centre for Amstrad.

A vacancy has arisen for a young person to join the sales team, assisting in the demonstration and sales of our entire range of products to customers in the showroom. Enthusiasm is essential, as well as experience of Acorn or PC compatible computers.

TECHNICAL SUPPORT ASSISTANT

Our Technical Support team provides answers and advice on an extremely wide range of subjects, covering both software and hardware on the BBC Micro, Master and Archimedes computers.

We are looking for someone who owns a computer themselves and can demonstrate their enthusiasm on the subject. Training will be given, although a certain level of knowledge concerning existing products will be necessary along with the ability to express yourself clearly in writing and on the telephone. Experience on PC compatibles would also be a benefit.

If any of these positions are of interest and you would like to work in a friendly but demanding company, please apply in confidence giving full details of yourself and any relevant experience.

Personnel Manager,
Beebug Limited,
117 Hatfield Rd,
St. Albans, Herts.
AL1 4JS

SOFTWARE PROJECT CO-ORDINATOR

This is a new and particularly interesting position for someone who has an eye for fine details. Reporting to the software manager, the successful applicant will have the opportunity to control new software projects for the Archimedes.

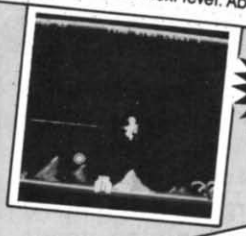
This is not a programming position, but knowledge of Basic and Assembler is essential (and C preferable) together with familiarity with popular applications software. The ability to write clearly will also be necessary to produce program specifications and user documentation.

THE MINERVA COLLECTION

Archimedes Games

JET FIGHTER

Alone on a forgotten planet you must defend yourself against all comers whilst rebuilding your broken rocket ship, then fuel it and take off to the next level. With the aid of your jet-powered backpack you move around to collect the various parts of the rocket. You must avoid collision with all other objects. Build and then fuel your rocket to take off to the next level. Absorbing fun for all the family.



NEW

THUNDERMONK

An intriguing new game with a variety of ways to achieve the ultimate goal of recapturing the Lonesome Monk's Monastery from the grip of the Evil Demons. Lead The Lonesome Monk's army through the labyrinths of the Monastery and recapture all the great treasures hidden in the building. Keep your eyes peeled for the secret passages. You too could walk through walls!

FREDDY'S FOLLY

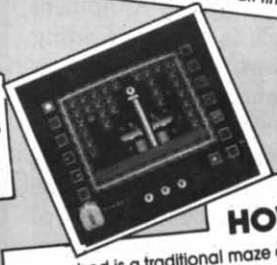
An enchanting game using animated graphics. Just watch the little men load the canon and pull it along. Notice the celebration when they win! Colourful fun for all the family. Sir Freddy is sneaky and envious of your castle so plans to bomb it with a fleet of balloons. You built a battlement to shoot down Sir Freddy in his balloon. Sir Freddy then hired several Gun ships to shoot your canon crew. Defend your castle and shoot down the balloons and the invading ships.

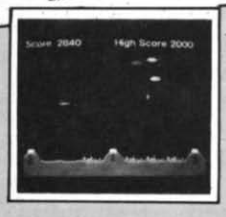
ORION

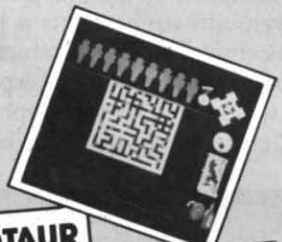
Skillfully manipulate Orion, the latest air to air combat interceptor, to defend your planet against the tide of marauding aliens. Shoot them down before its too late! Score points by saving your men before they are changed into mutants –otherwise they will turn against you. Contains Baiters, Pods which explode into Swarmers and waves of Bombers. Orion is a fast and furious scrolling 'shoot em up' game based on the all time arcade classic.

MISSILE CONTROL

Missile Control is a classic arcade game written for the Archimedes to make full use of the advanced graphics and sound, while remaining faithful to the original concepts of the game. The Player is in control of the missile launches and must do the utmost to protect the cities from the incoming missiles. On each subsequent attack further planes, satellites or 'smart' missiles attack the target cities.







HOVERBOD

Hoverbod is a traditional maze adventure in the style of the classic Manic Miner, yet it is of stupendous proportions. Hoverbod, the yellow sperical droid, has been banished from the planet Zingle and goes in search of some stolen treasure. The player must guide him through the perils which befall him and help him puzzle his way through the eight different levels to the final quest level. But beware . . . the Ibbies and Squibbles start to materialise!!!!

MINOTAUR

The Minotaur maze game is aimed at a market for children or adults who want a game where quick shoot-out reactions are not necessary. Theseus walks around the Labyrinth, collecting items to assist in the search of the ill fated men which have been provided as food for the Minotaur. The ultimate aim is then to kill the Minotaur and lead the men out of the Labyrinth to safety. The maze size is fully definable by the User. Games may be saved and reloaded for use at a later time.

NEW

£19.95

IBIX THE VIKING

You'll have as much fun designing this game as playing it! Play to your own level – child/adult/designer versions all on the one disc. Choose from the pre-programmed games or design your own. A fascinating and absorbing arcade game for all the family. A 'Designer Game' of new dimensions!

MINERVA SOFTWARE

£14.95 each

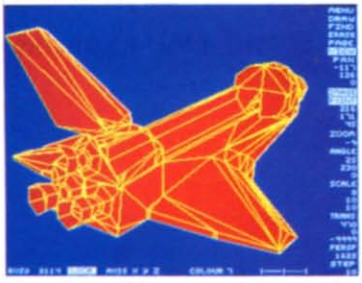
IBIX £19.95

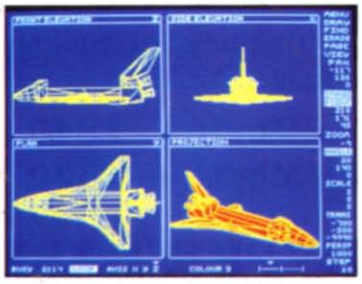
69 SIDWELL STREET · EXETER EX4 6PH · TEL: EXETER 0392 437756 · FAX: 0392 421762

SILICON VISION

SOFTWARE FOR THE ARCHIMEDES & BBC

SolidCAD





The ultimate 3D Draughting System for Architectural design, Interior design, Engineering Design and Teaching CDT. Allows drawing in plan, front & side elevations and also directly in 3D view. Includes powerful zoom & pan options for precision draughting and surface definition for creating solid colour objects. Also includes Sweep, Extrude & Macro facilities for designing very complex objects easily. Designs created with SolidCAD are compatible with the Realtime Graphics Language for high-speed flicker-free animation. The custom Archimedes version also performs smooth shading for realism. SolidCAD(Arc) users can upgrade to the Realtime Solids Modeller (Arc) for £40.00.

£49.95 (ARC or BBC B/B+/Master), New

REALTIME SOLIDS MODELLER

The package includes both the sophisticated design environment of SolidCAD and the high speed animation capability of a Realtime Graphics Language (RGL) module developed in pure ARM Risc code for supercharged performance. The package is ideal for Architectural design, Interior design, Engineering design & teaching CDT. The RGL module can be used to create standalone flicker-free animation of designs from your own programs. Smooth shading is also performed for realistic images. Through our in-house expertise in 3D Design and High-speed techniques, no other package can rival the design environment & animation speed of the Realtime Solids Modeller.

£89.95 (ARC) New

REALTIME GRAPHICS LANGUAGE

The Realtime Graphics Language rom provides a complete 3D Solids/Wireframe animation system with 52 star commands and 3D Editors for designing objects to animate from your own programs. Includes a 35,000 pixels / sec line generator for fast 3D drawing rates, 3D Rotate, Scale, Orbit, Perspective and Turtlegraphics. Also compatible with designs created with SolidCAD (BBC).

£49.95 (BBC B/B+/Master)

SUPER-DUMP

The ultimate printer driver which takes advantage of the highest resolution capability of ordinary Epson compatible printers to provide 1920×1024 resolution. Images can also be scaled, positioned and previewed before printing. Fully compatible with SolidCAD, Realtime Graphics Language, Gate-Array design system & 3D CAD/Animation system. Your own graphics programs or other CAD packages can be made compatible with Super-Dump by the addition of a few simple commands. An example program is included in the package.

£15.95 (BBC B/B+/Master), £24.95 (ARC) New

Presentation System

The package provides an interactive environment to create, edit and play-back computer controlled presentations for lectures and demonstrations. Also handles graph plotting for polynomials & user-defined functions which can be incorporated within the presentations.

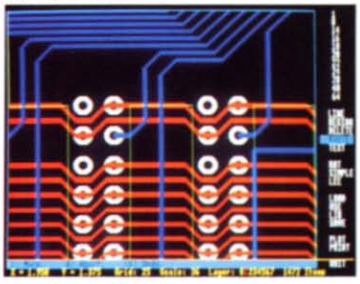
£34.95 (BBC B/B+/Master), £49.95 (ARC) New

All Archimedes software run in native mode on A305 – A440 & A3000 with Arthur 1.2 or RISC OS

SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW
MIDDLESEX HA1 2AG. TEL: 01-422 2274 or 01-861 2173
FAX: 01-427 5169. TELEX: 918266 SIGNAL G.

(Access/Mastercard/Eurocard accepted)
All prices include VAT and Carriage (Overseas orders add £4).

ARC-PCB



The ultimate PCB design system developed specifically for the Archimedes with a specification that cannot be matched. Includes Automatic routing, Rats-nesting, 8 layers, Surface mount capability, 0.001" resolution, 32"×32" maximum board size, On-line Help, Fast Zoom/Pan/Redraw, Text & Silkscreen facility, Variable Line/Pad/Text/Grid sizes, Part Libraries, Block Move/Copy/Rotate/Mirror/Erase options, and up to 300,000 components.
For hardcopy, the system supports the industry standard HP-GL, GRAPHTEC, PLOTMATE plotters and printers at their highest resolutions. Also provides automatic drilling information with extensive support from PCB manufacturers for final layout and production, optional 1 year telephone Hotline support (£100) and software maintenance service (£75) is also available.

£195.00 (ARC) New

Risc BASIC

The first true BASIC V syntax compiler which will convert your programs into supercharged Risc code for turbo performance leaving the competition standing. Features include Relocatable modules, full cross references. Double precision floating point & Integer support, in-line assembly, Window-based or command line compilation environment, standalone code generator, object code optimiser, full array manipulation and dimensions support, multiple exit structures & full runtime error handler.

£99.95 (ARC) New

RiscFORTH

A new 32-bit implementation of the FORTH-83 standard, designed to take full advantage of the ARM architecture. Features include Multi-tasking, Optimising compiler, built-in ARM assembler with floating point mnemonics, built-in Full screen Editor, File system interface, OS calls support, Floating point & Integer maths, WIMP support, Single-step debugger, Shadow screen for documentation, Block manipulation, Dictionary & Vocabulary display, Call finding and a standalone code generator.

£99.95 (ARC) New

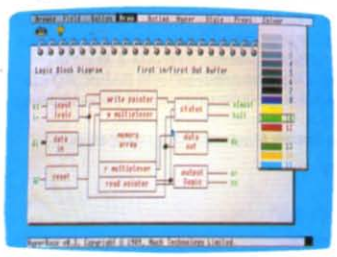
MACH

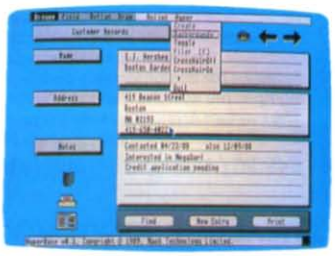
ARCHIMEDES MEMORY UPGRADES

Break the Megabyte barrier with Mach Technology's 2MB and 4MB expansion boards for 300 Series machines.

2Mbyte — £340
4Mbyte — £520

HYPER BASE





An advanced database architecture supports 'cards' and 'stacks' which can contain textual and graphical information in any combination.

Cards may be connected via user defined links to allow arbitrary information networks to be constructed.

Other features include powerful search and query functions across text fields, sorts and calculations, report generation and printing and the exchange of text and graphic images with other programs.

£49.95

MODULA-2

The epitome of structured programming languages now available on the Archimedes.

* Advanced development environment
* Separate compilation
* Rapid development cycle
* System library support for Risc Os, graphics, WIMP
* Extensive documentation
* Language tutorial

£89.95

MACH BASIC

A true production quality compiler that supports the full BASIC V language. State-of-the-art parsing, analysis and code generation techniques combine to produce the fastest compiler around.

£39.95

TECHNOLOGY

MACH-286

Open the door to largest software base in the world with our fully IBM compatible co-processor.

The Mach-286 features a full-speed Intel 80286, the MS-DOS operating system, standard graphics support, numeric co-processor facility, the Mach BIOS and more for only £299.

HARD DISC SYSTEMS

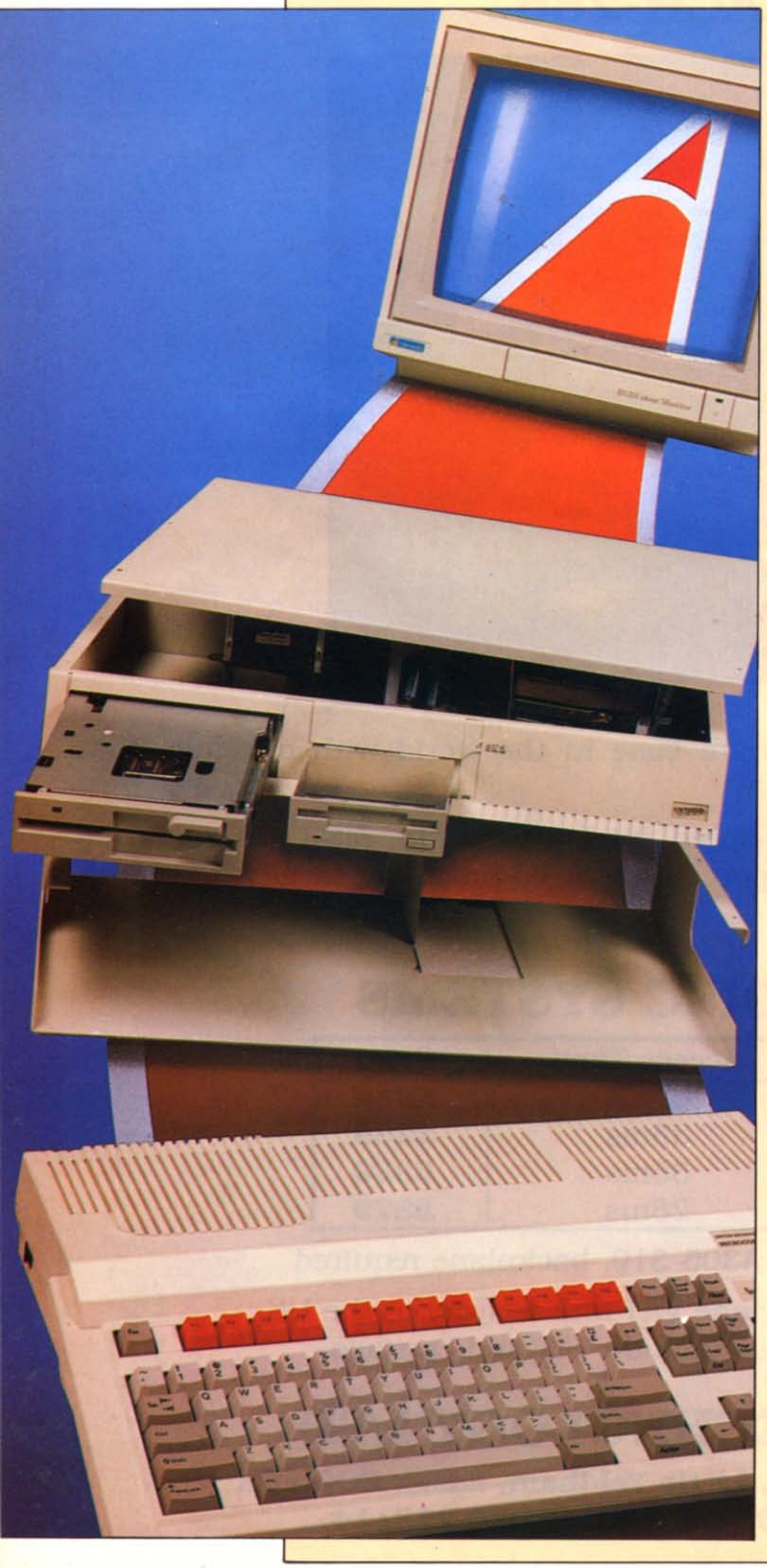
Capacity	Access Time	Price
20Mb	65ms	**£249**
20Mb	35ms	**£289**
30Mb	35ms	**£339**
40Mb	28ms	**£379**

Compatible with A305-310, backplane required

Software prices include VAT and delivery in the UK
Hardware prices exclude VAT and carriage

MACH TECHNOLOGY LTD

75 Hydewood Road, Little Yeldham, Essex CO9 4QX
Tel: (0787) 238125. Fax: (0787) 238114



THE design of the 32 bit BBC Micro – with its disc drive in the side – prevents the use of a normal type of bridging monitor stand because it would obstruct the disc slot. The stand on Acorn's pictures of the micro overcame the problem by resting on the edges of the machine, but where can add-ons like a second disc drive live?

Pres, aware of the tangles of leads associated with the 8 bit BBC Micro, have found an ideal solution – a modular monitor stand that can house several units such as disc drives.

Owners of an unexpanded A3000 just need the actual monitor stand – A3K1 – so lets take a look at that first. The stand is a pressed steel cantilever construction with a similar finish and colour to the micro. It is in two parts with the flat top surface screwed to the base – this is removed and used on top of level 2 when you expand your system.

The machine slides neatly underneath with the disc drive still easily accessible from the side. The base of the stand is designed to make pressing the reset button tricky but not impossible – a useful feature.

For people who like their micro pulled well forward to work on there's no problem as, using this unit, the monitor is effectively free standing. However, for those who are security conscious the units could be screwed to the robust stand and this can easily be bolted to the desk – ideal for applications like education.

The real difference to a standard monitor stand comes with the next level – the A3K2 – which allows you to expand your set-up neatly up to three floppies and a hard drive without a mass of untidy leads. The new unit screws to the top of the base one in place of the original top plate, which now fits on the top of the whole unit.

On the front are push-out slots for two disc drives. The left hand one is designed so that a slot for a 3.5in drive or a 5.25in one can be opened up, while in the middle is room for a 3.5in drive.

The drives supplied by Pres are finished in the same colour as the one in the side of the A3000, but it is not possible to just use that drive as it is slightly thinner than the standard unit.

Moving right again, there's a dual-purpose LED on the front panel. This is always used as a power on indicator, but if a hard drive is fixed a different colour indicates the disc is being accessed.

Inside the case there is plenty of room for a hard disc drive and a power supply for all the drives – all obtainable from Pres. Slots in the bottom of the case allow the neat routing of leads between micro and peripherals.

Using this unit the A3000 can be expanded easily and in a very tidy way. Your BBC Micro can now become a four megabyte hard disc machine without a lead in sight.

However, expanding a micro needs more than just disc drives and memory and the A3000 allows two podules to be connected – one internal and one external. An external podule can just be plugged in but with the obvious problems of

Components of the new stand that bring the BBC Micro into a powerful integrated unit

Putting the Archimedes in its place

Pete Davidson examines a new modular monitor stand that gives the A300 room to expand its power house

A3K1	£24.95
A3K2	TBA
3.5in drive	TBA
5.25in Drive	TBA
Hard disc	£499

Supplier: Pres, PO Box 319, Lightwater, Surrey GU18 5PW
Tel: 0276 72046

possible damage to the exposed circuits or poor contact because of flexing connections.

Pres have solved the problem with a case to house the external podule. It's due to be released very soon and will screw to the A3000. Like the monitor stand, it is expandible.

Inside it you will be able to fit a backplane which will take an ordinary podule – most likely the hard disc one – together with up to four mini podules. Several are already well along the road to being released.

These include a high specification a/d converter, a d/a converter of similar standard, user rom and battery-backed ram, Midi, SCSI, and a mini podule to allow two VDUs to be connected. The last one would allow, say, text to be displayed on one screen while graphics are on another.

A couple of other products that we'll soon be seeing from Pres are a 1MHz bus and user port podule to fit inside the A3000, and a read/write DFS. Combined with the 5.25in drive the latter will help all those who want the 32 bit machine to emulate the 8 bit BBC Micro in every way.

So the A3000 will soon be able to be expanded in to an even more powerful machine. As the products are released we'll be looking at them in detail.

Basic state: The A3000 topped by the original monitor stand

P.R.E.S

SEE US AT THE BBC ACORN USER SHOW STAND Nos. 62, 63, 65

TELEPHONE: 0276 72046
FAX: 0276 51427

IN THE FOREFRONT OF A3000 UPGRADES

CAN HELP YOU TURN THIS . . . . .

INTO THIS . . . .

BY PROVIDING .....

A3K1 . . . a free-standing monitor plinth that allows the A3000 to move back and forth beneath the monitor, helps prevent accidental contact with reset key and is upgradable to . . .

A3K2 . . . provides the scope for up to two further floppy drives (3.5/5.25) AND a hard disc drive housed with style above the A3000 — no boxes hanging on the end of ribbon cables.

ALSO A3K3 . . . a specially designed case to house Podule/expansion cards. This case locates and is bolted to the back of the A3000 to ensure a safe and sturdy expansion. The bonus is that it will be expandable to take up to a further 4 smaller podules. Current development includes . . . ADC/DAC, SCS1, battery-backed RAM, midi, etc.

Also a user port, 1 mHz bus, also disc drive expansion board, with more planned.

For more information, price, and advanced orders please call or write to P.R.E.S. Ltd., P.O. Box 319, Lightwater, Surrey, GU18 5PW.

Dealer and educational enquiries invited.

The quest continues

The full solution to two more levels of The Last Ninja

LAST month we gave some coded clues together with maps and the solution to help you, the last Ninja, in your quest to recover the scrolls. Now we present the maps and solutions to help you complete the next two levels and next month, in the final part of the series, we'll explain how to reach the scrolls.

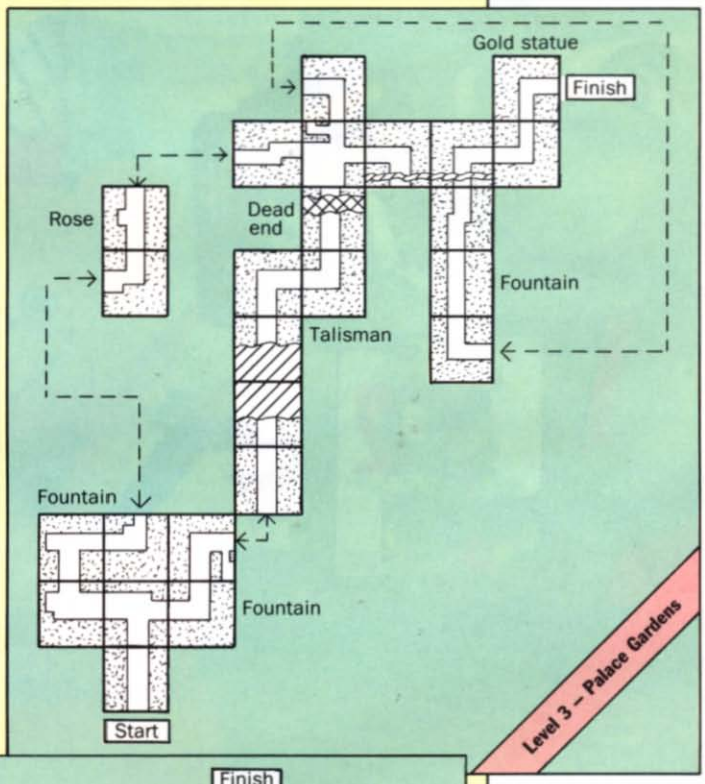
THE SOLUTION – Part 2

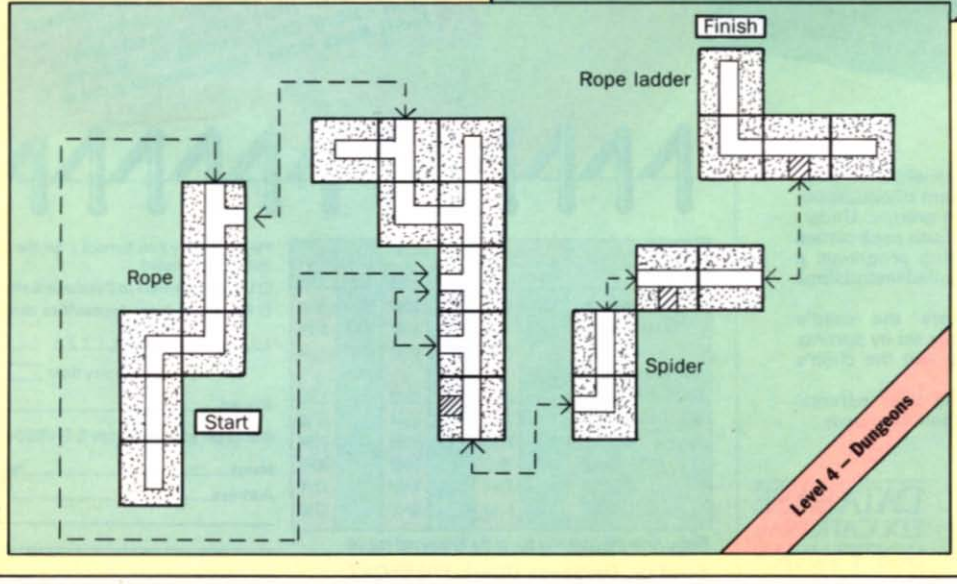
LEVEL THREE

Hold the glove which you found on level two to pick up the rose, otherwise you'll prick your finger and die. At the large yellow statue at the end, hold only the talisman found around a Buddha's neck on this level and walk up to pray to end the level.

LEVEL FOUR

Collect the rope and use it to climb up the ladder at the end. Shoot the spider.





● *If you don't already have a copy of The Last Ninja, see the offer on Page 118*

Learning has never been such fun!

fun school 2

Fun School 2 for Over-8s contains:

- **Build a Bridge:** Shape-fitting challenge
- **Passage of Guardians:** Enjoy anagrams
- **Unicorn:** First steps in problem solving
- **Logic Doors:** Mapping made easy
- **Souvenirs:** An introduction to travel
- **Code Boxes:** Discover binary arithmetic
- **Mystery machine:** Have fun breaking codes
- **Escape:** A final check on progress

Fun School 2 for 6 to 8 year olds contains:

- **Number train:** Calculations made enjoyable
- **Shopping:** Which shops for which products?
- **Maths Maze:** Fun improving arithmetical skills
- **Treasure Hunt:** Introduction to coordinates
- **Bounce:** Get to grips with angles
- **Packing:** Discover tesselating shapes
- **Caterpillar:** Word building challenge
- **Number jump:** Have fun practising tables

Fun School 2 for Under-6s contains:

- **Shape Snap:** Colourful shape recognition
- **Find the Mole:** Experiment with number sizes
- **Teddy Count:** Ideal introduction to numbers
- **Write a Letter:** Creative fun at the keyboard
- **Colour Train:** Play at spotting colours
- **Pick a Letter:** Word building made easy
- **Spell a Word:** Enjoy naming the pictures
- **Teddy Bears Picnic:** Move around a maze

Now children can really have fun while learning. Fun School 2, designed by a team of educationalists, is available for three age groups: Under-6s, 6-8 year olds and Over-8s. Each pack comes with eight colourful and exciting programs, a colourful button badge and detailed instructions giving educational help.

The computer itself monitors the child's progress. The skill level – initially set by parents – is automatically adjusted to suit the child's ability.

Now children can enjoy using their parents' computer while they learn at their own pace.

Available for:
Spectrum, Commodore 64, Amstrad CPC, BBC Micro/Electron £9.95 (tape) £12.95 (disc).

Also: Atari ST, Amiga, PC £19.95

DATABASE EDUCATIONAL SOFTWARE

Format	Under-6s		6-8 years		Over-8s	
	Tape	Disc	Tape	Disc	Tape	Disc
Spectrum	9094	9095	9096	9097	9098	9099
Commodore 64	9064	9065	9066	9067	9068	9069
Amstrad CPC	6179	6180	6181	6182	6183	6184
BBC Micro/Electron	2239		2242		2245	
BBC B+/Master 40T		2240		2243		2249
BBC B+/Master 80T		2241		2244		2250
Atari ST		9192		9193		9194
Amiga		9842		9843		9844
PC 5.25"		5764		5765		5766
PC 3.5"		5767		5768		5769

Please circle the code number of the format you require

Send to: Database Direct, FREEPOST, Ellesmere Port, South Wirral L65 3EB.
Access/Visa orders: Tel: 051-357 2961

Please supply Fun School 2 for the code number(s) circled

☐ Cheque payable to Database Software

☐ Please debit my Access/Visa card no.

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date ☐☐/☐☐

Signed _____

Add £2 per program Europe & Eire/£5 Overseas

Name _____

Address _____

_____

_____

Postcode _____

MU9

THE BEEB BODY BUILDING COURSE

Non-standard serial interfacing

Mike Cook connects his micro to an electronic thermometer

THERE are a great number of low cost useful modules available from the Far East complete with built-in liquid crystal displays. For example I acquired an electronic micrometer and a temperature control module at a fraction of the cost it would take me to make them. This is the effect of mass production. Incidentally, did you hear the one about the Japanese electronics manufacturer who was so successful that he had to move into smaller premises?

Now I did look – in the November 1987 Body Build article – at how to tap into a liquid crystal display, but it is neither simple nor cheap. Fortunately most of these modules also have a serial output which can be read by a micro. The snag is that the form of the serial data is far from standard.

The BBC Micro is fitted with a serial interface which handles standard asynchronous data. The start of each data package is signalled by a start bit. The package follows one bit at a time for seven or eight bits and finally there is a stop bit when the data line returns to the resting state. The start and stop bits allow the receiver to synchronise to the incoming data every byte, hence the name asynchronous. The speed accuracy requirement for this system is only about four per cent and it is used for remote computers like MicroLink.

There is another form of data known as synchronous where the receiver has to run at exactly the same rate as the receiver. There is no synchronising after each character, instead the receiver is synchronised at the start of the whole message. Obviously the speed accuracy requirements for this is much greater. Your disc drive works with synchronous serial data.

The accuracy needed for these two systems normally calls for the frequency stability of a crystal. However these low cost modules can't afford the luxury of a crystal so they have developed another non-standard way of communicating. There are no start and stop bits, instead when the data bit is changed on the serial output another output produces a pulse. The whole message is output like this in one continuous stream, bits in the stream standing for the various digits and flags.

While this is going to vary from module to module, the general principles are the same so I am going to outline a method that should cope with any number of serial bits.

If there were only eight bits in the data output you could use the shift register built into the VIA; this would then require a minimum of software overheads. However most modules produce very much longer data streams, typically from 13 to 35 bits. Fortunately the data bits are output relatively slowly – with about 1ms between each pulse.

The trick is to make each data pulse generate an interrupt and let the interrupt service routine read the current data bit and assemble it into bytes. This has the advantage of being a background task – when the software is installed and running it needs no further attention from Basic and a second program can be run.

For my working example I will look at a temperature module sold for under £7 from Maplin. The data format is shown in Table I. D1 indicates the data bit that is output first, D13 being last. Data is produced every time a reading is taken by the module. This is link selectable to be every second or 10 seconds.

The first thing we need to do is to boost the signal to the logic levels required by the BBC Micro. Most modules work off a 1.5 volt battery, so that tends to be the signal level they produce. This can be done simply with a pair of transistors shown in Figure I (see over). Note that this will, in fact, invert the signal, but we can always turn it

Turn to Page 24 ▶

D1	Hundreds (Degrees F) or Sign (Degrees C)
D2	Bit 3 Tens
D3	Bit 2 Tens
D4	Bit 1 Tens
D5	Bit 0 Tens
D6	Bit 3 Units
D7	Bit 2 Units
D8	Bit 1 Units
D9	Bit 0 Units
D10	Bit 3 Tenths
D11	Bit 2 Tenths
D12	Bit 1 Tenths
D13	Bit 0 Tenths

Table I: Data from Temperature Module

&70, &71	Data working locations
&80, &81	Data result locations
&7F	New data flag
&7E	Number of bits master location
&7D	Number of bits to go, working location

Table II: Memory usage

◀ *From Page 23*

the right way round in the software.

Having got the hardware out of the way quite quickly this month, let's look at what we need to gather the data. This is shown in the listing and consists of three main parts. The first is the initialisation routine – lines 80 to 280 – then the interrupt handling routine lines – 290 to 490. Finally, a simple example of how Basic can interact with the data. Note that the first part could well have been written in Basic, but I chose to use machine code so that the system could be easily re-initialised with a CALL &A00. This will be needed whenever the Break key is pressed, in fact line 60 makes this happen automatically.

The memory allocation is shown in Table II. Basically locations &70 and onwards are used to accumulate the data. When it is all in it is transferred to locations &80 onwards. The first job is to initialise the locations defining the number of bits to store, lines 90,100. Then the working location is incremented. This is needed because the first time the interrupts are enabled on the VIA it will produce an interrupt because of the pulses it has previously received. Therefore the very first interrupt will be a spurious one; line 110 compensates for that.

Next the unrecognised interrupt vector must be transferred to our own storage area and replaced with the vector into our routine. This is done in lines 120 to 190. As we do not want this process to be interrupted in case only half a vector is present, we have to disable the interrupts while this is going on. Then the VIA is initialised to produce an interrupt on a falling edge of CB1. For a full explanation of what bits control what function on the VIA see the Advanced User Guide. Finally in this section the data reception area is cleared to make sure we start with a clean slate.

Now whenever an interrupt is generated by our data clock signal the code starting at PIRQ will be executed – line 290. First we look to see if it is our device that has generated the interrupt, this is important if there are other interrupting devices connected to the micro, like a mouse.

Line 330 reads the data in, remember from Figure I this is connected to bit zero. Now we have to build this up into a few bytes achieved by first shifting the data bit into the carry flag and then performing a series of rotate instructions on the memory locations we are working on. This trans-

PUBLIC APOLOGY

M.D. Office Supplies would like to take this opportunity to apologise to all its competitors. We shall with immediate effect supply direct to the public, Computer discs, Storage boxes, etc. AT BELOW WHOLESALE PRICES

5¼ 5.25" DISCS & BOXES 5¼

25 5.25" DS-DD 96 TPI with 50 Capacity Lockable Storage Box £12.49
50 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box £18.49
75 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box £23.49
100 5.25" DS-DD 96 TPI with 100 Capacity Lockable Storage Box £29.49
200 5.25" DS-DD 96 TPI with 2 100 Capacity Lockable Storage Boxes £54.99

OUR 5.25" DISCS ARE **VERY CAREFULLY SELECTED** TO GIVE YOU 100% ERROR FREE PERFORMANCE. EACH DISC IS OFFERED WITH OUR 100% MONEY BACK GUARANTEE AND IS SUPPLIED WITH LABELS

3½ 3.5" DISCS & BOXES 3½

25 3.5" DS-DD 135 TPI with 40 Capacity Lockable Storage Box £22.95
35 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box £31.95
45 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box £37.95
55 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box £44.95
65 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box £49.95
75 3.5" DS-DD 135 TPI with 80 Capacity Lockable Storage Box £54.95

OUR 3.5" DISCS ARE **VERY CAREFULLY SELECTED** TO GIVE YOU 100% ERROR FREE PERFORMANCE. EACH DISC IS OFFERED WITH OUR 100% MONEY BACK GUARANTEE AND IS SUPPLIED WITH LABELS

HIGH DENSITY 5.25" DISCS

25 5.25" DS HD 1.6MB plus 50 BOX £21.99
50 5.25" DS HD 1.6MB plus 100 BOX £41.99
100 5.25" DS HD 1.6MB plus 100 BOX £69.99

HIGH DENSITY 3.5" DISCS

10 DS HD 3.5" DISCS £19.99
30 DS HD 3.5" DISCS £57.99
50 DS HD 3.5" DISCS £94.99

BULK BUYERS

100 DSDD 3.5"TPI £69.99
150 DSDD 3.5" £100.00
200 DSDD 3.5" £129.99
500 DS DD 3.5" £304.99
250 DSDD 5.25" £64.99
500 DSDD 5.25" £119.99
1000 DSDD 5,25" £219.99

PRICE AND QUALITY GUARANTEE

All our Discs are top quality products and are certified 100% error free. Should you ever see a comparable product advertised in this magazine at a lower price we will not match it we will

BEAT IT GUARANTEED

VISA

M.D. OFFICE SUPPLIES

18 CRESCENT WAY, FARNBOROUGH, KENT BR6 9LS

TELESALES HOTLINES: 0689-61400

All prices include VAT and Delivery UK only

Supplied subject to availability. E/OE

fers the data from the carry flag into the memory and moves up the previous bit pattern to make room for the new arrival. Just like the song "There were five in the bed and the little one said roll over".

When that has been done we have to decrement the number of bits to go counter in &7D. As we do this we will set the zero flag when the last bit has been read, causing the branch in line 380 to be taken every time but the last. At this point the data is transferred from the working locations to the final locations, inverting them to compensate for the interface for each byte.

Finally the bit counter is restored from the store ready for the next message, and the flag location is cleared.

The flag location is used by any program interacting with this interrupt service routine. By looking at this memory address it can see if a new piece of data has arrived since the last time it looked. When it sees that new data has arrived it sets the flag to a non-zero value after taking the data. Data is always available, but by using this flag you will see only new data.

The final part of the program illustrates this point – lines 520 to 590. The loop in lines 530 and 540 holds the program until data has been received then line 550 puts this value into a variable *T*. At first sight this might seem a little complex, however refer to Table I again and you will see that each digit is in four bits, one in &81 and two in &80. Line 550 adds up the contribution made to the final temperature by each of the three digits.

You can see it contains three sums, first the digit is isolated from the rest of the byte using an AND operation and then it is multiplied or divided to be the right size, that is tens, units and tenths of a unit.

I was running the module in the degrees C mode and so data bit 1, that is bit 4 in &81, contains the sign of the temperature. Line 560 extracts this and sets up a string variable. Finally line 570 prints the result and line 580 sets the flag indicating we have gathered that piece of data.

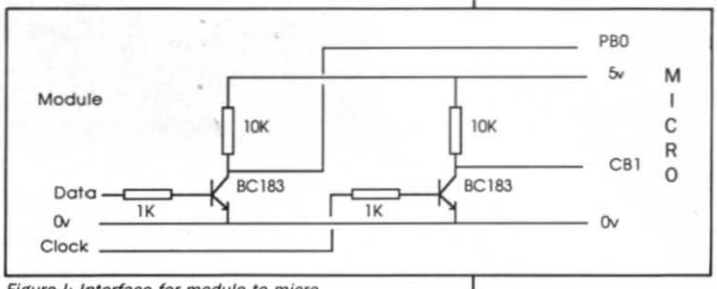


Figure I: Interface for module to micro

If you have more data in your module you simply use more than the two memory locations I have used here. Whenever you see an operation on &70 and &71 repeat this for &72 and &73 and so on. The same goes for locations &80 onwards.

A final note of caution when debugging the program: Remove line 60 and always press Break between each trial run. If you don't you will transfer the value of the interrupt vector, which will have been set as the entry to our service routine from the last run, into the storage location. This will result in an endless loop when the next interrupt is generated, thus the micro will hang and the only way to revive it will be with Break.

Once this patch is installed it becomes part of the operating system and you can do any other operation with the micro. In this way you can make great uses of these low cost modules in your own monitoring and control applications.

```
   10 MODE 7
   20 PRINT"Beeb Bodybuilding Course"
   30 PRINT"Non standard serial input"
   40 PRINT"By Mike Cook"
   50 FOR A%=0 TO 2 STEP 2
   60 *KEY10 CALL &A00|M
   70 P%=&A00:[OPT A%
   80 \ Initialise Patch
   90 LDA #13   \ Number of bits to read
  100 STA &7E:STA &7D
  110 INC &7D   \ Compensate for first i
nterrupt
  120 SEI \ Stop interrupts
  130 LDA &206  \ Transfer Vector
  140 STA VEC1
  150 LDA &207:STA VEC1+1
  160 LDA #(PIRQ MOD 256)
  170 STA &206
  180 LDA #(PIRQ DIV 256)
  190 STA &207
  200 LDA &FE6C \ Set up Control line B1
  210 AND #&EF:STA &FE6C
  220 LDA #&90  \ Enable interrupt on VI
A
  230 STA &FE6E
  240 LDA #0
  250 STA &70:STA &71 \ Clear reception
locations
  260 CLI       \ Allow interrupts to be
 dealt with
  270 LDA #1:STA &7F \ First time no fla
g
  280 RTS
  290 .PIRQ     \ Interrupt handling
  300 LDA &FE6D \ See if it for us
  310 AND #&10
  320 BEQ NUS   \ Branch if not
  330 LDA &FE60
  340 LSR A     \ Put bit into carry
  350 ROL &70   \ Transfer to memory
  360 ROL &71
  370 DEC &7D   \ Have we had all bits?
  380 BNE NUS   \ Branch if not
  390 LDA &70   \ Transfer to reading lo
cation
  400 EOR #&FF:STA &80
  410 LDA &71:EOR #&FF:STA &81 \ Other b
yte
  420 LDA &7E:STA &7D \ Restore bit coun
t
  430 LDA #0
  440 STA &7F   \ Clear new reading flag
  450 .NUS      \ On your way
  460 JMP (VEC1)
  470 .VEC1 NOP:NOP
  480 ]:NEXT
  490 *KEY9P.((?&81 AND 7)*10+((?&80 AND
 &F0) DIV 16)+(?&80 AND &F)/10)|M
  500 REM Now Initialise Patch
  510 CALL &A00
  520 REPEAT
  530 REPEAT
  540 UNTIL ?&7F=0
  550 T=(?&81 AND 7)*10+((?&80 AND &F0)
DIV 16)+(?&80 AND &F)/10
  560 IF (?&81 AND &10)=0 S$="+" ELSE S$
="-"
  570 PRINTTAB(0,7);"Temperature is ";S$
;T;" C "
  580 ?&7F=1
  590 UNTIL FALSE
```

Get it right!

```
 10 = 1092 2  210 = 6082 4  410 = 8F97 B
 20 = 17E7 C  220 = 8FC1 4  420 = 732A 0
 30 = 6143 C  230 = 78D4 8  430 =  295 3
 40 = FC23 A  240 =  295 D  440 = 26EA A
 50 = BFB0 C  250 = 8DED B  450 = 3328 C
 60 = 7AE9 9  260 = 4683 B  460 = B795 C
 70 = 1054 F  270 = E69D E  470 = 729C 0
 80 =    0 F  280 = 9843 F  480 = DA42 6
 90 = C787 6  290 = 87FF A  490 = 19CE A
100 = 9B71 6  300 = AD15 6  500 =    0 A
110 = F815 1  310 = 4497 7  510 = 286D 9
120 = 8B8C C  320 = F0B7 D  520 = BFBA C
130 =   4B 6  330 = A0F8 3  530 = BFBA 8
140 = D556 5  340 = 2A3B A  540 = CDF2 C
150 = 6188 3  350 = 2D62 D  550 = 2FF4 E
160 = B7BC 6  360 =  67C 0  560 = AE6B B
170 = E756 F  370 = 7495 2  570 = F0B8 A
180 = 3CFC C  380 = C6D5 B  580 = A8CC 3
190 = F777 2  390 = D2DF 0  590 = 226C 4
200 = 3482 A  400 = 296F C
```

IMPRESSION

One solution for all your word processing AND desk top publishing requirements.

IMPRESSION

Impression is supplied with the new outline font manager, and so is capable of producing outstanding quality prints on everything from dot matrix printers to typesetters.

IMPRESSION

Impression is the first word processor designed for RISCOS—it multi-tasks with other RISCOS applications and supports direct, in-memory data transfer between them. For example, a diagram can be imported from Draw by simply dropping its file icon onto a frame in Impression—the diagram is then immediately transferred to Impression. The same applies to Edit and Paint.

IMPRESSION

Impression is a fast and very compact program, which means that it is ideally suited to a 1MByte machine. It is extraordinarily powerful—able to handle all documentation needs from simple one sided letters to the most complex magazine layout. Unlike other DTP programs, Impression is also capable of handling long documents with ease. Yet despite its versatility, Impression remains supremely easy to use.

Ask for our detailed brochure or come and see Impression in action at the BBC Acorn User Show

Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX.
Tel: (0442) 63933. Fax: (0442) 231632.

B B+ M

The inside story

Exploring memory is made easy with Jonathan Hartson's routine

MOST disc filing systems provide a *DUMP command to list the contents of a file in both hexadecimal and characters. This routine provides a command – *MDUMP – which does exactly the same with an area of memory, not just main memory, but sideways rom, shadow ram and the Tube.

The listing generates the MDUMP command file. Type it in and check it with Get it Right! When run it generates the code and saves it as MDUMP. Tape users should change these two lines:

```
 90 mcode%=&B00
760 LDA #18:JMP OSBYTE
    \ Reset function keys
```

The command is called by entering:

```
*MDUMP addr
```

followed optionally by either an end address or + and a length – the same format as *SAVE. All the addresses are given in hexadecimal, and tape users should use */MDUMP wherever a reference to *MDUMP is made.

To dump 16 bytes of memory starting at &700 you could use

```
*MDUMP 700+10
```

or:

```
*MDUMP 700 710
```

As this is the area of memory used by Basic to hold the command line just typed in, you will see something like:

```
000700 2A 4D 44 55 4D 50 20 37 *MDUMP 7
000708 30 30 20 2B 31 30 0D 00 00 00 +10..
```

If no end address or length is given the dump will keep going until Escape is pressed.

Giving the start address in the format Frssss – in the range F00000 to FFFFFF – causes rom number r to be paged in and dumped, so:

```
*MDUMP FD8000+20
```

dumps the first 32 bytes of rom 13. If you have a second processor attached addresses in the Fxxxxx range will address the I/O processor's memory, so:

```
*MDUMP FF3000+40
```

will dump the start of the area of memory reserved for the screen in the I/O processor. Also:

```
*MDUMP F8000 FFFF
```

will dump the second processor operating system on a 6502 second processor.

The BBC B+ and Master series have more memory hidden away inside them – both have the shadow screen. There's spare memory left over from that on the B+ and Masters have the private workspace ram. Given an address in the format EFssss the *MDUMP command will dump this memory. That is:

- The shadow screen at EF3000 to EF7FFF.
- The spare sideways ram at EF8000 to EFAFFF on the BBC B+.
- The MOS workspace ram at EF8000 to EF8FFF on the Master.
- The filing system ram at EFC000 to EFDFFF on the Master.

The table on the following page gives a

Turn to Page 28 ▶

Use of osbyte 0

OSBYTE 0 reports what operating system the machine is running. When entered with X=0, an error message is displayed with the version. With *X* as non-zero, *X* is returned holding a number referring to the OS number. These are:

0	BBC Micro, OS 0.10 and Electron
1	BBC Micro, OS 1.20
2	BBC B+, OS 2.00
3	BBC Master, OS 3.20
4	BBC Master ET, OS 4.00
5	Master Compact, OS 5.00

This is similar to INKEY(-256), but gives an easier series of numbers to decode.

```
*MDUMP F98000 +100
F98000 4C E8 85 4C 8D 82 C2 22 Lh.L..B"
F98008 21 4D 49 4E 49 20 4F 46 !MINI OF
F98010 46 49 43 45 20 49 49 20 FICE II
F98018 52 4F 4D 53 00 32 2E 30 ROMS.2.0
F98020 31 44 00 28 43 29 20 31 1D.(C) 1
F98028 39 38 36 20 44 61 74 61 986 Data
F98030 62 61 73 65 20 53 6F 66 base Sof
F98038 74 77 61 72 65 00 00 00 tware...
F98040 00 4C 63 80 4C B4 80 4C .Lc.L4.L
F98048 13 81 4C 66 81 2B 9E 4C ..Lf.+.L
F98050 95 80 4C 94 82 4C 86 82 ..L..L..
F98058 00 CD 12 48 AD 00 A0 68 .M.H-. h
F98060 4C 52 80 08 78 85 07 86 LR..x...
F98068 08 84 09 BA BD 03 01 85 ...:=...
F98070 06 BD 02 01 85 05 A0 01 .=.... .
F98078 B1 05 9D 02 01 C8 B1 05 1....H1.
F98080 9D 03 01 C8 B1 05 85 00 ...H1...
F98088 A8 B9 00 A0 A4 09 A6 08 (9. $.&.
F98090 A5 07 58 28 60 78 85 07 %.X('x..
F98098 86 05 84 06 A0 02 B1 05 .... .1.
```

Sample output from MDUMP

◀ *From Page 27*

summary of the addresses you can use with this command.

The program has been tested on BBC Micros on all operating systems from 1.20 onwards and with several DFSs. It will work with NFS 3.60, but the NFS 3.34 rom has a bug in the routine to return the address of the command line, so it will not work. If you have that rom you should take advantage of the service offered by many companies cheaply – or freely – to upgrade it.

"The program will work with NFS 3.60, but the NFS 3.34 rom has a bug in the routine to return the address of the command line"

How it works

The first part of the program calls the filing system to get the address of the parameters on the command line. It then checks that the first is a valid hexadecimal address and reads it in to the zero page locations *addr* to *addr+2*.

After skipping any spaces, if there are no more parameters it jumps forward to start the dump with the forever flag set – as it was when the program started – to &FF. If there is another parameter, it is examined after the forever flag has been reset by giving it a value with bit 7 equal to zero. The character just fetched will be in the range 0 to 127, so that is used.

If the following parameter is preceded with a +, the following address is fetched and the start address added to it. Otherwise, the address is fetched as it is.

If there is deviation from the expected syntax the error message:

```
Syntax: MDump <start> (<end>/+<length>)
```

is given. As the first part of the program is only executed once, this is used later as variable space to save memory and squeeze the routine into 512 bytes so that it will fit in the cassette buffer.

The next section of the program checks which machine it is running in by using osbyte 0 and sets some flags for accessing the various bits of memory accordingly. Unexpanded BBC Bs and Electrons don't have the extra memory, so this part is skipped. Masters and BBC B+s do have it, so the access flag *acc–flg* is set to &FF to signal this.

The BBC B+ accesses its extra memory by setting the rom/ram select latch at &FE30 to 128. This is noted by setting *acc2* to 128. The Master and the BBC B+ both access their extra memory by fiddling with the ACCCON register at location &FE34 and the variables *acc1* and *acc2* are set to note this.

Address	BBC B	BBC B+	Master
000000 to EEFFFF	Normal language – main memory if no second processor, second processor memory if there is.		
EF0000 to EF2FFF	Main I/O processor memory		
EF3000 to EF7FFF	Main memory	Shadow screen memory	Shadow screen memory
EF8000 to EF8FFF	Sideways rom#15 memory	Spare sideways memory	MOS and VDU workspace
EF9000 to EFAFFF	Sideways rom#15 memory	Spare sideways memory	Sideways rom#15 memory
EFB000 to EFBFFF	Sideways rom#15 memory	Sideways rom#15 memory	Sideways rom#15 memory
EFC000 to EFDFFF	MOS rom	MOS rom	Filing system workspace
EFE000 to EFFFFF	Machine operating system rom (and memory mapped I/O ports)		
Fx0000 to Fx7FFF	Main I/O processor memory, including the non-shadow screen memory. x is ignored.		
Fr8000 to FrBFFF	Sideways rom/ram number r.		
FxC000 to FxFFFF	Machine operating system rom		

The addresses to use to dump various areas of memory

For a detailed explanation of the ACCCON register see the New Advanced User Guide by Dickens & Holmes. It is sufficient to say that on the BBC B+, bit 7 controls whether shadow screen ram is paged in, and on the Master bits 2 and 3 control whether the shadow ram and filing system workspace ram are paged in or not. As the other bits also affect the system's setup, they have to be preserved when changing bits 2 and 3. Seven is then added to the end address for checking later.

The program goes into a loop which performs the following:

- The current address is printed.
- Eight bytes are fetched into the buffer. They are

printed in hexadecimal.

● The eight bytes are then printed in characters. Ones in the range 128 to 255 are displayed as characters 0 to 127 but ones with values 0 to 31 (the control codes) and 127 (delete) are displayed as full stops.

● Eight is added to the current address, and if the forever flag is set the routine jumps forward to prepare to loop around again.

● If the forever flag is not set a check is performed to see if the end address has been reached. This is done by masking out the bottom three bits and Exclusive ORing the end and the current addresses. If these are the same – ignoring the bottom three bits – the program jumps to exit.

At this point, before looping back again a check is made on the escape flag, location &FF. If Escape has not been pressed the program loops back to do another eight bytes. If it is being pressed it is acknowledged and the program exits.

```
  10 REM SOURCE FOR *MDUMP
  20 REM *MDUMP <start> (<end>/+<length
>)
  30 REM by J.G.Harston
  40 REM (C) The Micro User
  50 OSWRCH=&FFEE:OSNEWL=&FFE7
  60 OSARGS=&FFDA:OSBYTE=&FFF4
  70 l_ptr=&A8:addr=&AA:rom=&AC
  80 end_ad=&AD
  90 mcode%=&900
 100 tempY=mcode%:buff=mcode%+2
 110 tube=&27A
 120 FOR P=0 TO 1
 130 P%=mcode%
 140 [OPT P*3
 150 LDA #1:LDY #0:LDX #l_ptr
 160 JSR OSARGS
 170 LDA (l_ptr),Y:CMP #13:BEQ syntax
 180 LDX #addr:JSR get_hex_addr
 190 JSR space2:BEQ mdump
 200 STA forever
 210 LDX #end_ad
 220 CMP #ASC"+":BEQ plus
 230 JSR get_hex_addr
 240 JMP mdump
 250 .syntax
 260 BRK
 270 OPT FNequs(CHR$220+"Syntax: MDump
<start> (<end>/+<length>)")
 280 BRK
 290 .plus
 300 JSR skpspc:BEQ syntax
 310 JSR get_hex_addr
 320 CLC:LDA addr:ADC end_ad:STA end_ad
 330 LDA addr+1:ADC end_ad+1:STA end_ad
+1
 340 .mdump
 350 LDA #0:LDX #255:JSR OSBYTE
 360 CPX #2:BCC mdump1:BEQ Bplus
 370 LDA &FE34:AND #&F3:STA acc1
 380 ORA #&0C:STA acc2:BNE set_acc
 390 .Bplus
 400 LDA #128:STA acc2
 410 .set_acc
 420 LDA #255:STA accflg
 430 .mdump1
 440 LDA end_ad:CLC:ADC #7:STA end_ad
 450 LDA end_ad+1:ADC #0:STA end_ad+1
 460 .loop
 470 JSR pr_addr
 480 JSR get_8_bytes
 490 LDX #0
 500 .loop1
 510 LDA #32:JSR OSWRCH
 520 LDA buff,X:JSR pr_hex
 530 INX:CPX #8:BNE loop1
 540 LDA #32:JSR OSWRCH
 550 LDX #0
 560 .loop2
 570 LDA buff,X:AND #127
 580 CMP #32:BCS pr_char
 590 .pr_dot LDA #ASC"."
 600 .pr_char CMP #127:BEQ pr_dot
 610 JSR OSWRCH
 620 INX:CPX #8:BNE loop2
 630 JSR OSNEWL
 640 LDA addr:CLC:ADC #8:STA addr
 650 LDA addr+1:ADC #0:STA addr+1
 660 LDA rom:ADC #0:STA rom
 670 BIT forever:BMI mdump2
 680 LDA addr:EOR end_ad:AND #&F8
 690 BNE mdump2
 700 LDA addr+1:EOR end_ad+1
 710 BEQ exit
 720 .mdump2
 730 BIT &FF:BPL loop
 740 LDA #124:JSR OSBYTE:\ Ack Esc
 750 .exit
 760 RTS
 770 .get_8_bytes
 780 LDX rom:BIT tube:BMI tubeget
 790 CPX #&EF:BCC getbyte4
 800 .getbyte1
 810 LDA &F4:PHA
 820 BIT accflg:BPL getbyte3
 830 LDA &FE34:PHA
 840 LDA acc1:CPX #&EF:BNE getbyte2:LDA
acc2
 850 .getbyte2
 860 STA &FE34
```

Get it right!

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 =    0 0
  50 = F2E0 0
  60 = B749 C
  70 = 135F 5
  80 = 7D48 4
  90 = 3456 7
 100 = AE1B 0
 110 = 5207 7
 120 = D689 3
 130 = 20AC 7
 140 = 20F3 7
 150 = 7477 5
 160 = 6F34 9
 170 = 9B62 B
 180 = DA5A F
 190 = A007 7
 200 = 192D 3
 210 = BF7F 1
 220 =  D16 8
 230 = C671 4
 240 = 54F6 7
 250 = 5A3C F
 260 = E2BF 1
 270 = AC0F 9
 280 = E2BF 4
 290 = D23B 9
 300 = 5926 9
 310 = C671 2
 320 = DE78 1
 330 = 33A9 9
 340 = 2E37 7
 350 = A388 1
 360 = 3C72 6
 370 = D53A 8
 380 = EEDE 4
 390 = F567 A
 400 = 18DB 2
 410 = 3E31 4
 420 = 7266 F
 430 = D4DE 2
 440 = C712 2
 450 =  DE4 5
 460 =  325 6
 470 = 6B03 E
 480 = CE92 A
 490 = EA45 C
 500 = 3311 5
 510 =  222 4
 520 =  CDA F
 530 = 3E72 9
 540 =  222 B
 550 = EA45 E
 560 =  372 6
 570 = 3381 0
 580 = 15C5 2
 590 =  887 C
 600 = 1655 9
 610 = 3C94 4
 620 =  E11 2
 630 = 9D84 2
 640 = C6F4 0
 650 = 60D0 2
 660 = 415E 5
 670 = 1C64 3
 680 = E35B D
 690 = E865 D
 700 = AC21 B
 710 = FB22 8
 720 = E4BD F
 730 = A66B 8
 740 = 11A6 4
 750 = DC83 4
 760 = 9843 6
 770 = 38D8 A
 780 = 8CCD 5
 790 = 13FE 5
 800 = 2D93 4
 810 = CC67 7
 820 = 9151 F
 830 = AC8E E
 840 = 585F 1
 850 = 1DF0 E
 860 = E997 E
 870 = 6F4A C
 880 = 4CA1 3
 890 =  DD1 4
 900 = 1D2F C
 910 = 7D36 9
 920 = 4371 C
 930 = 174B 1
 940 = DCE4 4
 950 = C0E0 A
 960 = D6D4 C
 970 = F197 9
 980 = CB09 3
 990 = 6D17 8
1000 = 7119 3
1010 = 5D74 A
1020 = 9843 F
1030 = CABC 6
1040 = D7CD 4
1050 = EF87 3
1060 = 29EB 5
1070 = 5126 2
1080 = FA82 6
1090 = BCC6 8
1100 = 9EB4 F
1110 = 40F6 3
1120 = 9DE0 0
1130 = 325D 8
1140 = A0EE 1
1150 = A3E1 F
1160 = 9843 A
1170 = 2EF9 B
1180 = 7AB5 E
1190 = A16C 3
1200 = 2DBF 6
1210 = D8B8 E
1220 = 2CD9 5
1230 = F3CA 0
1240 = DBD4 7
1250 = B492 5
1260 = BF9F 6
1270 = CBD7 0
1280 =  3A8 E
1290 =  295 9
1300 = EE66 E
1310 = 47CB 9
1320 = 9999 F
1330 = EEE8 0
1340 = 8C08 7
1350 = 8A9D 9
1360 = 20F8 D
1370 = 3DC8 7
1380 = FB5F B
1390 = 8CBF 3
1400 = 617F D
1410 = 7629 4
1420 = 9843 E
1430 = 2962 E
1440 = 2B5A 7
1450 =  83E 4
1460 = 1268 7
1470 = 8091 1
1480 = 65BA F
1490 = 1066 3
1500 = D5FE 5
1510 = 38BF 5
1520 = 64C0 1
1530 = BAD9 B
1540 = 8F2A C
1550 = 5324 2
1560 = D3CF 1
1570 = E4C2 4
1580 =  A10 0
1590 = 2D98 C
1600 = 8B58 1
1610 = 2C83 4
1620 = 236C 3
1630 = B59E 0
1640 = FD2E E
1650 =  B1B F
```

Turn to Page 30 ▶

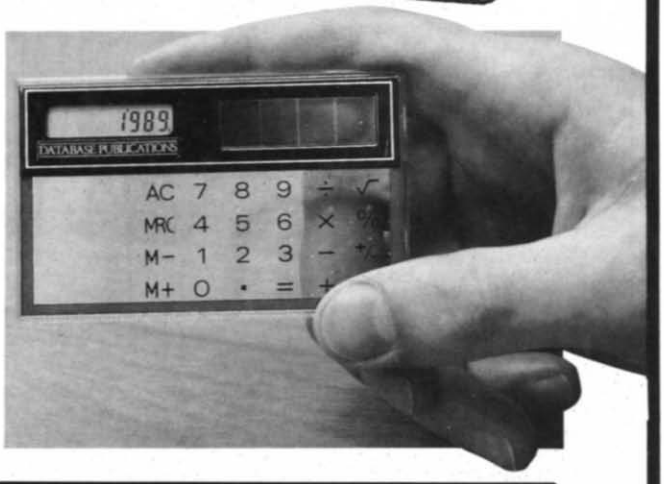
◀ From Page 29

```
  870 CPX #&F0:BCS getbyte3
  880 LDA #&8F:STA &F4:STA &FE30:BNE get
byte4
  890 .getbyte3
  900 LDA rom:AND #15:STA &F4:STA &FE30
  910 .getbyte4
  920 LDX #7:LDY #7
  930 .getbyteloop
  940 LDA (addr),Y:STA buff,X
  950 DEY:DEX:BPL getbyteloop
  960 LDA rom:CMP #&EF:BCC getbyte6
  970 BIT accflg:BPL getbyte5
  980 PLA:STA &FE34
  990 .getbyte5
 1000 PLA:STA &F4:STA &FE30
 1010 .getbyte6
 1020 RTS
 1030 .tubeget
 1040 CPX #&EF:BCS getbyte1
 1050 .tubeclaim \Claim tube hardware
 1060 LDA #&C0+&10:JSR &406:BCC tubeclai
m
 1070 LDX #addr:LDY #0
 1080 LDA #0:JSR &406:LDX #0
 1090 .tubeloop
 1100 LDY #9:\ 24ish us delay
 1110 .tube_wait
 1120 DEY:BNE tube_wait
 1130 LDA &FEE5:STA buff,X
 1140 INX:CPX #8:BNE tubeloop
 1150 LDA #&80+&10:JSR &406:\ Release tu
be hardware
 1160 RTS
 1170 .pr_addr
 1180 LDA rom:JSR pr_hex
 1190 LDA addr+1:JSR pr_hex
 1200 LDA addr
 1210 .pr_hex
 1220 PHA:LSR A:LSR A:LSR A:LSR A
 1230 JSR h_first:PLA
 1240 .h_first
 1250 AND #15:CMP #10:BCC h_over
 1260 ADC #6:.h_over
 1270 ADC #48:JMP OSWRCH
 1280 .get_hex_addr
 1290 LDA #0
 1300 STA 0,X:STA 1,X:STA 2,X
 1310 .nextchar
 1320 LDA (l_ptr),Y:JSR asc_to_bin
 1330 BCS gh_exit
 1340 ASL A:ASL A:ASL A:ASL A
 1350 STY tempY:LDY #4
 1360 .gh_again
 1370 ASL A:ROL 0,X:ROL 1,X:ROL 2,X
 1380 DEY:BNE gh_again
 1390 LDY tempY
 1400 INY:BNE nextchar
 1410 .gh_exit
 1420 RTS
 1430 .asc_to_bin
 1440 CMP #48:BCC illegal
 1450 CMP #58:BCC zero_nine
 1460 SBC #7:BCC illegal
 1470 CMP #64:BCS illegal
 1480 .zero_nine
 1490 AND #&0F:RTS
 1500 .illegal
 1510 SEC:RTS
 1520 .skpspc INY
 1530 .space2 LDA (l_ptr),Y:CMP #32
 1540 BEQ skpspc
 1550 CMP #13:RTS
 1560 .accflg:BRK
 1570 .acc1:BRK
 1580 .acc2:BRK
 1590 .forever:OPT FNequs(CHR$255)
 1600 ]
 1610 NEXT
 1620 $&780="*SAVE MDUMP "+STR$~(mcode%O
R&FFFF0000)+" "+STR$~(P%OR&FFFF0000)
 1630 X%=&80:Y%=7:CALL&FFF7
 1640 END
 1650 DEFFNequs(A$):$P%=A$:P%=P%+LENA$:=
P%3
```


THE MICRO USER Reader offers THE MICRO USER Reader offers

EXCLUSIVE

Solar powered, see through calculator. FREE with orders over £25*



Using state-of-the-art technology this calculator has an invisible membrane keypad, runs from solar cells (so you'll never need any batteries), and because it's only the size of a credit card it fits easily in your wallet or pocket.

This exclusive limited edition calculator can be yours for just £7.95 – or we'll send you one ABSOLUTELY FREE with every order over £25!

** UK orders only (not subscriptions). Subject to availability*

TO ORDER PLEASE USE THE FORM ON PAGE 119

SOFTWARE SCENE

White Magic ... spell binding game

Price: £9.99 (tape) £11.99 (disc)
Supplier: The Fourth Dimension, PO Box 4444, Sheffield.
Tel: (0742) 700661

WHEN I first loaded this game it reminded me strongly of that arcade classic Gauntlet which was never released for the BBC Micro. The object is to negotiate the 32 different levels of mazes, collecting treasure and various artifacts along the way. Each labyrinth has a title which gives you a small clue as to its nature.

To complete it, you have to find all the treasure and the master key which opens up the trapdoor to the next one. All this has to be done inside a time limit and failure to do so means the end of the game.

Completing the levels is made more difficult by the many obstacles which bar your path, including doors which can only be opened once you have the correct keys, fungus which you can walk through but is damaging to your health and sliders which move across your path and injure you when you get in their way. Of course, no game of this sort would be complete without the nasties, and they come in the form of ghosts, spectres, guards and trolls, all bent on stopping you.

There are two ways to deal with them: The first is by hand to hand combat, which is carried out by simply walking into them although this also results in them damaging you. The second and much better way is throwing missiles thus avoiding contact and allowing you to kill them at no risk to your own health. This however, is easier said than done.

Along the way, you will bump into magical artifacts to help and hinder. For example, there are crosses which are of great benefit to your health, while the stealers destroy any keys which you may be carrying. It didn't take me long to learn which objects I needed and which I had to avoid.

An interesting feature is that you can play four different characters during the game, although only one appears on screen at a time. You can choose between Kaldor the leprechaun, fleet of foot but not very good at combat, Mandrake the enchanter, useful when it comes to using the magic potions which are dotted around, Cheysul the titan, who is best suited to performing tasks of great strength and lastly Moriana the warrior, who is well armoured and perfect for combat.

It doesn't take long to learn which of the four to use for the many tasks which have to be carried out. To summon one you simply hit the appropriate key – 1 to 4 – and within a couple of seconds the character you summoned appears where the last was standing. Each starts off with 6000 health points and the game ends if one of them dies.

The graphics are smooth and fast – the monsters can be on to you almost before you have time to react. I should point out here that I found some of the sprites used are very similar to those in a couple of other games, including Ravenskull, Dunjunz and Repton.

In fact, in some ways the game could be considered to be a sort of cross between those three with a hint of Icarus and Imogen thrown in for good measure.

The sound effects are few and far between – just a few beeps and blips that manage to keep you informed of your progress. I found this a refreshing change from some of the loud and obtrusive pieces of music that some games blast out..

One minor criticism about the tape version – I'm one of the lucky ones who can slip a disc into the drive and have the game up and running in seconds. However, if you want to play this from cassette it's only fair to warn you that you'll have a very long wait.

I found White Magic contained enough variations of puzzles and mazes to keep me well entertained. It has just the right level of difficulty to make the game possible to complete without being too easy – it took me about an hour of play to penetrate to the fourth level.

I reckon that the sign of a good game is when it manages to keep you playing, just so that you can see what the next level is like, and this one certainly manages to do that.

If the other levels can maintain the high entertainment value that is produced by playing the first few, The Fourth Dimension should be on to a real winner here.

Desmond

Graphics	*8*
Sound	*8*
Playability	*9*
Value for money	*9*
Overall	*9*

SOFTWARE SCENE

Avon and Murdac ... the bard's tale

Price: £17.50 (40 track disc)
Supplier: Topologika, PO Box 39, Stilton, Peterborough PE7 3RL.
Tel: 0733 244629

TOPOLOGIKA is a software house that has steadily gained a first class reputation in the provision of adventure games and educational software. It's not surprising, really, when you remember that the stable of writers includes such luminaries as Jonathan (Kingdom of Hamil) Partington, Jon (Acheton) Thackray and Peter (Philosopher's Quest) Killworth.

Just issued is a double-game blockbuster from the combined talents of Jonathan Partington and Jon Thackray. The disc contains two quite different text-only adventures that delighted my purist heart: **Avon** and **Murdac**.

The package consists of the usual neat folder containing the disc, two leaflets introducing the background to each adventure, two sealed envelopes embellished with the admonition *Don't be tempted* – concealing clue sheets – and last, but not least hour upon hour of fun and frustration.

I'll begin with Avon, since that should be regarded as the A side of this particular release. As the title hints, it is a brilliant romp that pays tribute to that Swan of Avon, that Bard illustrious, Will Shakespeare no less.

As a tourist from the United States, here you are in Stratford absorbing the atmosphere when slowly but steadily the magic of history begins to take effect – as the introduction puts it, *There was nothing I could get my bearings from. Modern Stratford was leaving me behind.*

And so you suddenly find yourself in the following location: *"You are standing on a flat plain. From here it seems that all the world's a stage, and all the men and women merely players. They have their exits and their entrances to the north, south east and west".*

With these words you are pitched headlong into a world redolent of Shakespearean references and allusions, many extremely funny, and a number of puzzles that need deductive and observational power to solve them rather than literary know-how.

I strongly recommend a good wander round the many locations that you can visit without needing to solve any puzzles first. I am delighted to say that Jonathan here follows the philosophy I heartily approve of – he doesn't pack the early stages of this adventure with puzzles that must be solved before the player can advance any further. Other, lesser, writers or would-be-writers, please note and follow the example set by these experts.

The only tiny problem that has to be overcome early on is that of finding some way of seeing in the dark – and those three charming ladies on the blasted heath have the answer to that. And, what's more, are quite willing to see eye to eye with you regarding your need.

Another acquisition which will be useful from very early on in the game is the equivalent to the packing-case used as a storage medium in Dungeon Adventure – and you should remember what use Sir John Falstaff made of it in the The Merry Wives of Windsor, too.

The language at times is lyrical and at others acts as a vehicle for the zany humour that characterises this adventure. I really must give a few examples to whet your appetites:

"A rather dull-looking constable appears, cries 'HAVOC', and lets slip the dogs of war. In fact a small chihuahua appears and stands barking at you. 'Drug squad', says the constable. 'I must search you for certain substances'.

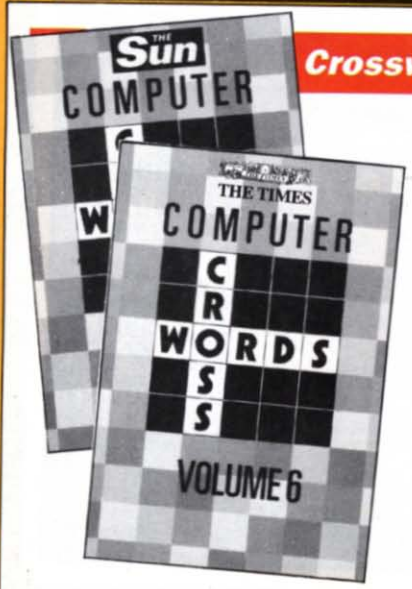
"You sit down at the feast. To your horror a ghastly vision appears and shakes its gory locks at you. It is the ghost of the Scotsman you have so foully slain! You stand and address this shadow, this unreal mockery, which only you can see. This displaces the mirth of the guests, who stand not upon the order of their going, but go at once. The ghost avaunts and quits your sight, melting into the wall to your

northeast. You are at the centre of the wood. To the south is a cottage which probably belongs to a retired criminal, for it bears the name Dunsinnin".

The parser is of the kind one has grown to accept as normal for a sophisticated adventure from a top flight author. It happily accepts multiple input such as GO NORTH,EAT THE PIE,OPEN DOOR,IN and can deal with exclusions such as TAKE EVERYTHING EXCEPT THE GOBLET.

It's very helpful when mapping to be given a long location description first time there and a shorter one on subsequent visits, but you can arrange to have the full description every time simply by entering the command VERBOSE. At the heart

Crosswords ... into the cryptic



Price: £18.95 (Times) £17.95 (Sun)
Supplier: Akom, 51 Manor Lane, London SE13 5QW.
Tel: 01-852 4575

CROSSWORD buffs will be pleased to know that the Times and Sun micro crosswords are now available for the Archimedes. While I have only seen volumes five and six of the Times and volume five of the Sun, I expect that the older volumes will eventually become available.

Layout and operation are identical for both, so my comments apply equally. With the disc you get a 12 page booklet with comprehensive starting and running instructions. There's a brief discourse on cryptic crosswords which is very helpful for beginners, a list of common abbreviations and another list of the convention indicators abbreviations such as anagrams, word division and synonyms.

There is also a full solution and analysis of the first puzzle. The analysis is right in the middle of the booklet, which is a bit strange. You're liable to start reading it accidentally before you realise it.

In the booklet you are instructed to press Shift+Break to start. In practice I found that Risc OS would happily run the boot file from the deskrop, but sadly, a smooth return is not possible as the exit routine in the program makes a mess of it.

There are 60 crosswords, which is enough to keep all but the most dedicated enthusiasts busy for quite a while. As well as selecting the one of your choice you have the option of somewhat superfluous sound – just a buzz as letters are entered on to the grid.

There is an interesting feature whereby two teams of players can solve the puzzles on the same crossword, competing against each other on a points basis. Each team takes it in turn to select a clue and solve it. Obviously, failing to solve the clue gives it free to the opposing team, so you can develop quite a complex strategy.

Prompts are fairly clear and the program is simple to use. After selecting a clue number you have the option of entering the answer directly or taking advantage of several levels of help.

You can ask for a hint in the form of the convention indicator, or the starting letter can be shown. Later you have

SOFTWARE SCENE

of the adventure – apart from the treasures to be collected – are a number of fascinating puzzles which will have many of you muttering away to yourselves as you try to solve them.

For me, the most fascinating was the casket problem: Lady Portia – from The Merchant of Venice – has three caskets, of lead, silver and gold.

The problem is working out in which order to open them so as to get the real prize as against the booby prize. You'll encounter this problem three times, since the action of the game takes place on three different dates – January 6, March 15 and June 24 – and a potion is your passport to time travel. There are a whole host of less complex puzzles, some of which need applied common sense and some a little general knowledge. Thus, you can pacify a musical gaoler provided you know who is his favourite composer. Similarly, you have to drink that old toper Sir John Falstaff under the table – which is perfectly feasible provided you use your loaf.

It's possible to get thoroughly pie-eyed on the Ides of March, but at the same time it could turn out to be a life-saver. I'd also recommend that you indulge in some asinine behaviour similar to that of King Nebuchadnezzar as recorded in the Book of Daniel.

A couple of final hints for this superb adventure: The command WAIT is invaluable at certain points in the game – and don't be afraid to draw your bow at a venture.

Avon is a game I can gladly recommend to expert and novice alike.

Moving on to **The Monsters of Murdac**, which is billed as a free inclusion, we come to an adventure of a very different type. Personally, I think **Murdac** should be included in its own right – albeit as the B side.

I should say right away that this is not for beginners, being designed to bewitch those who rate themselves as competent or expert.

The initial scenario consists of 14 locations only, but since one is a locked house that contains a cellar you needn't worry. In fact there's around 70 locations in all.

However, while careful mapping is essential, the chief pleasure has to do with solving quite complex puzzles rather than exploring exotic locations.

The opening problem was, to my mind, very difficult, since it involved a minimum move sequence to locate a building site while something could still be done. However, if you are successful, I would refer you to Psalm 98 verse 7 as found in the Book of Common Prayer – and urge you to remember how Joshua fought the battle of Jericho.

Also in the opening sequence, a sword needs to be obtained. Remember how King Arthur got Excalibur? Well, making the appropriate noises could well do you the same sort of favour.

Perhaps the chief puzzle in Murdac is working out how to free the wizard's daughter from her troll-guarded cell (shades of Twin Kingdom Valley) without ruining your chances of solving other problems as well. You'll need to be a master of disguise, totally trustworthy and also adept at timing.

There's a lovely description of the place where you find the wizard:

"You are at the top of the hill, which falls away steeply on three sides. In the distance you can see various curious scenes, including a disused shooting gallery, a garden from which giant rocks are taking off, a large cornfield, a giant spider's web and a distant bungalow by the seaside. The path leads back downwards from these awe-inspiring sights".

If I tell you that the spider's web is a reference to Quondam, can you work out what the other adventures are?

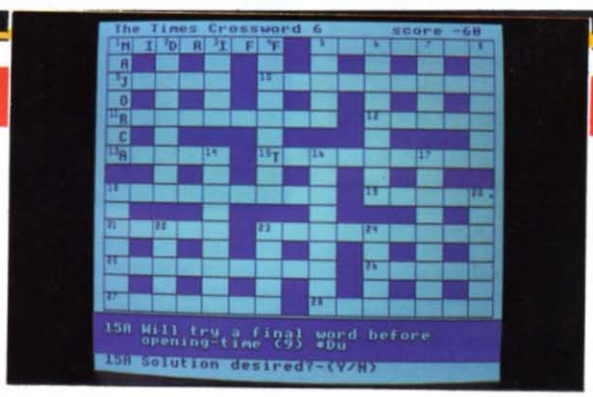
One important objective in the game is working out where to keep your treasures – but don't deposit them before you are sure you won't need them again. They tell me that cold showers are good for you, but a hot one can be invaluable for getting a monkey off your back.

Finally, both adventures contain mazes – with a difference. One in Avon is redrawn every time you go there, and not a single one can be mapped by dropping things. How times have changed.

This two-game disc is an absolute must for any serious adventurer.

Mad Hatter

Presentation	9
Atmosphere	10
Puzzlement	9
Value for money	10
Overall	9



the option to guess, and the computer will indicate which letters are correct, wrong ones being converted to lower case.

If all else fails the computer will offer the solution. Using this feature will subtract the score value from your total.

At any point, through the help system you can cancel with C and then select another clue to work on, or quit the entire game using Q. This I found very useful. In fact, I like the way the help system is set up, as it lets you work at your own level. When you have completed a game you are given the number you solved unaided and the overall time taken.

An annoying omission is a save facility. I would like to be able to leave an unfinished crossword on the disc and return to it later but without the save option you must work right through or start all over again. The whole idea of using a computer is negated if you have to write down the words you have found each time you stop.

Crosswords are laid out on an adequate, if uninteresting grid, more or less as they would appear in the newspaper. No use is made of the mouse, nor are the Archimedes' graphic capabilities used. Clearly a standard program is being used across a wide range of machines of different makes, which probably makes good economic sense but gives a somewhat unremarkable and pedestrian effect on the 32 bit machine. A racehorse in the shafts of a cart is the picture that comes to mind.

The crosswords themselves are good, being collections of those used in the respective papers. The style and difficulty seems very similar for the Sun and Times crosswords. Perhaps unfairly, I expected the Sun ones to be easier. In the preface they are described as being a few easy ones among the hard ones. But to me, a relative novice, they were hard or harder.

Terry Blunt

Sound	3
Graphics	3
Playability	7
Presentation	6
Value for money	7
Overall	6

SOFTWARE SCENE

Ballistix ... bite the bullet

Price: £9.95 (tape), £11.95 (disc)
Supplier: Superior Software, Regent House, Skinner Lane, Leeds LS7 1AX.
Tel: 0532 459453

THIS latest release from Superior Software is basically a kind of cross between air ball and pinball. Apparently, this has already been a smash hit on several other types of machine, but to be frank, after only a short time playing the game I failed to see why it was so popular. Maybe this version is not quite as good as the others.

A ball is thrown into the field of play at the halfway point between yours and the opposition's goals, the idea being that by positioning your firing arrow and hitting the fire key a number of small balls are shot at the large one. Depending at what angle these small balls hit, they force the large ball to move in different directions.

The object of the one player game is to win all 29 levels and amass as high a score as possible. To win a level you have to score three goals before three are scored against you. If you fail at any level the game ends and you have to start at the first again.

The two player game takes place on 30 slightly different areas but the basic principle is the same. The two players fire at the large ball and try to score against each other. Either the greatest number of levels won or the highest score can be the winner. It is up to you to set the conditions for victory before the match starts.

Scoring depends on how impressive are the goals you achieve. If you fire one from just in front of the goalmouth you get a low score; a long distance shot is worth a lot more. Occasionally, one of the letters that make up the word RICOCHET appears on the playing area. If you shoot the letter, it appears in your box, at the side of the playing area.

If you manage to collect all the letters, you gain a bonus to your score. If you hit a letter that you already have, it is removed from your box. Another way of gaining a bonus score is by hitting bonus tiles which occasionally appear.

Several additional features appear in the playing area – ridges, splitters, bumpers, magnets, holes, tunnels, red arrows and oil slicks – all designed to increase the difficulty of each level. The graphics are smooth and clear, but there is little to make them visually more interesting, and the game components could have been made a lot more interesting. The firing arrow, for instance, could have been made to resemble a gun or something like that – it would look a lot better than the simple arrow.

The sound is passable, but there is nothing new here either. The ball bounces around making fairly realistic noises as the small projectiles are fired at it. I fail to see why game writers feel it necessary to put in the sound of an audience applauding.

Every time you score a goal, you are "treated" to the sound of frying chips. It tends to get a bit tedious after a while and doesn't serve any real purpose. Fortunately, you can turn the sound off.

I found the one player game initially interesting, but after a while it became tedious. The two player version has more challenge and is the only one that saves Ballistix from being a complete flop. If you can't find an opponent to play it with, I'd forget it.

Llewelyn

Sound	7
Graphics	8
Playability	7
Value for money	5 (one player)
	8 (two player)
Overall	7

Ibix the Viking ... small is beautiful

Price: £19.95
Supplier: Minerva Software, 69 Sidwell Street, Exeter EX4 6PH
Tel: 0392 437756

IT is fair to say that Minerva is the most prolific producer of games software for the Archimedes. The latest offering is Ibix the Viking and very interesting it is too.

This is an arcade adventure in the Citadel mold. As Ibix you wander around a very complex and detailed landscape avoiding certain types of terrain and most of the moving objects while collecting treasure. And frankly that's about it. But the humour and well-balanced gameplay hold the attention as you solve the puzzles available on each screen.

Unlike the huge range of Citadel *collectables* there are few specific objects needed – four colour-coded keys will open similarly shaded doors, the up-down control box must be picked up before the lifts will work and so on. By collecting every piece of treasure on a level you complete it and move on to the next.

The puzzles themselves are usually composed of moving objects – other vikings, arrows, druids or strange green beasties – the lifts which – if you're not careful you can park in inaccessible places, and the portcullises which descend rapidly once you've gone under them enforcing a one way trip.

However Ibix is not completely defenceless, as he can throw his sword repeatedly, although I think an axe would have been more appropriate for a Viking. The moving people can take a number of hits before they vanish, opening a way forward. There is a sort of sword thermometer on the left of the screen which shrinks as more are thrown, but the size is restored by picking up sword icons.

Your score is determined by the amount of treasure collected. On each screen you start with zero, and silver coins with 10 marked on them pile up on the right hand side. When you collect 10 they convert into a gold one with 100 marked on it. A running total is maintained between screens, and your final score is displayed when you lose the last of your lives.

You are provided with two files of eight levels each called Easy – the default – and Hard. There is a jump facility to let you start at any Easy level but you do need passwords for the Hard ones.

There is also an editor – *de riguer* with games of this sort nowadays – which allows you to design your own screens and also alter the characteristics of each of the sprites. In fact there are two groups: The more-or-less immobile scenery, and animated objects. In all there are some 189 basic pieces of scenery, each of which can have various attributes, and 36 moving objects.

Unfortunately the individual sprites, though detailed and colourful, are only about 0.5in high on screen. What happened to the massive Thundermonk designs? All the sounds seem to be sampled – mostly stolen from Adam and the Ants records – plus some undefinable background noises. My only criticism was that each effect seemed too short – maybe because of memory limitations.

However, this is a fun game and I enjoyed playing it. The default screens take you very simply through basic puzzles getting you familiar with the style of problem and how to solve them.

As time goes on the Archimedes game scene is improving, but they've still a long way to go to match even the 16 bit games of the Atari ST and Commodore Amiga. C'mon Minerva, take a look at the competition.

Lazarus

Sound	8
Graphics	8
Playability	9
Value for money	8
Overall	8

COMPUTER SHOPPER SHOW '89

NOVEMBER 24 - 26, ALEXANDRA PALACE

INCORPORATING THE WONDERFUL WORLD OF THE ACORN

Enter the brand new Acorn-backed Computer Shopper Show, the ultimate venue for a shopping spree for all BBC Micro and Electron users.

Designed to replace the Electron & BBC Micro User Show, many of the 250 stands will be selling Acorn products, making it the biggest-ever pre-Christmas computer event designed with BBC Micro and Electron buyers in mind.

For three days in November, Computer Shopper will transform London's Alexandra Palace into the world's largest hypermarket offering computer gifts.

The choice of Acorn products will never have been greater – nor will the number of special show offers.

There's only one show for BBC Micro and Electron owners in the run up to the festive season – that's the Computer Shopper Show. Order your tickets today by returning the coupon with your payment or telephone 051-357 2961 for credit card bookings.

The Great Hall,
Alexandra Palace,
Wood Green, London N22

10am - 6pm Friday, November 24
10am - 6pm Saturday, November 25
10am - 4pm Sunday, November 26

Sponsored by ***Computer Shopper***

Organised by DATABASE EXHIBITIONS

Please supply:

☐ Adult tickets at £3 (save £1) ..... £.....
☐ Under 16s tickets at £2 (save £1) ..... £.....
☐ Family tickets at £9 (save £5) ..... £.....

☐ Cheque payable to Database Exhibitions
☐ Please debit my Access/Visa card no.

Total £.....

Expiry date: /

Admission at door: £4 (adults) £3 (under 16s)

Advance ticket orders must be received by Wednesday, November 15

Name.....

Address.....

.....

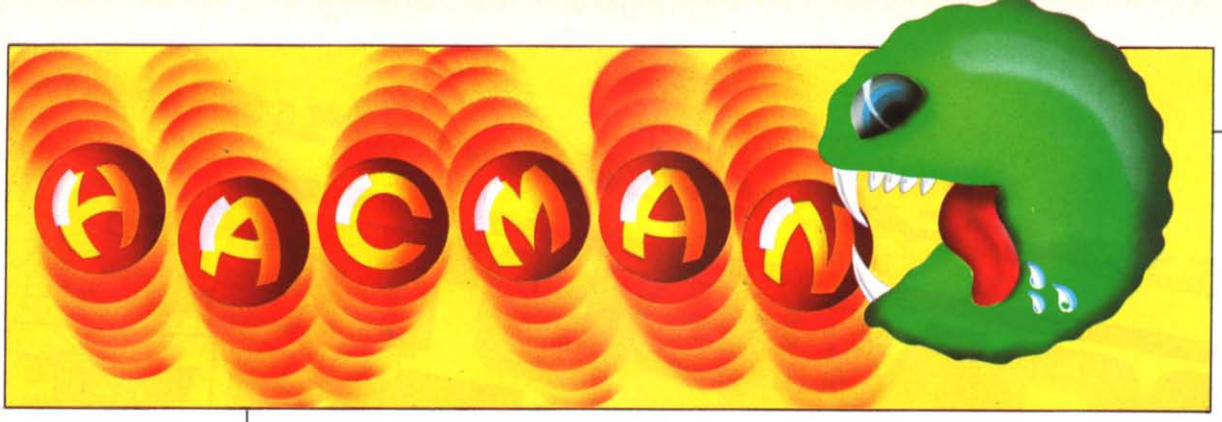
Postcode ..... Signed .....

PHONE ORDERS: RING Show Hotline: 051-357 2961
PRESTEL ORDERS: KEY *89, THEN 614568383
MICROLINK: 72:MAG001

Please quote credit card number and full address

POST TO: Computer Shopper Show Tickets, Database Exhibitions, PO Box 2, Ellesmere Port, South Wirral L65 3EA.

A756



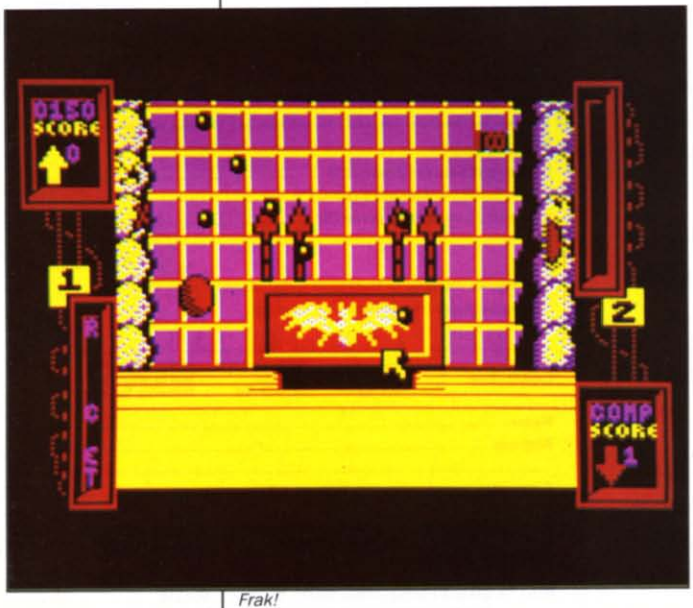
B B+ Master Electron

Found — the lost chord

Many more useful hints and up to the minute information from the Hac Man

Featuring:

- Repton Infinity
- Warehouse
- Ravenskull
- Skirmish
- Ballistix
- Pipeline
- Quazer
- Elixir



Frak!

PROGRAMMERS are a funny bunch of people and games programmers doubly so. You can just imagine them hunched over a hot micro, sweating out how to squeeze a 20k screen into 16 bytes and whether changing a single instruction will save a single cycle of machine time. How do such people relax? Well, Simon Charlott of Harrogate, North Yorks, has written with news of an undocumented feature of the loading routine of Superior's *Pipeline*, obviously included as a humorous but otherwise useless item.

Instead of CHAINing the game from tape or pressing Shift+Break to start up from disc, type:

```
LOAD"MENU"
```

Master Compact owners should type:

```
*MOUNT
LOAD"MENU"
```

Then:

```
PAGE=PAGE+&1C00:RUN
```

pressing Return after each of the above lines. A previously inaccessible piece of music will now begin to play. Simon found it when he listed the MENU file and noticed that the very last line was not used in the program. No prizes for guessing that this was the *PAGE=PAGE+&1C00:RUN* line shown above.

I always think one of the best ways for would-be programmers to learn the tricks of the trade is to look at what has been done by those currently at the leading edge, and this is a nice bonus for those keen on furthering their knowledge. Elite, for example, introduced a number of new programming techniques, ones that are now used as standard by today's top game authors. Of course, four years on many have been improved upon — but that's progress.

Although this hidden tune is a nice surprise for anyone trying to learn from the programming techniques used in the game's loader, it is by no means a new idea. I first encountered it on the loaders of Frak! and the Electron version of Zalaga by my good friend Orlando.

If you own the original Aardvark version of Frak or Beau-Jolly's Five Star Games III compilation, on which the game also appeared, insert the cassette appropriately rewound and type LOAD"". When the first part, called Frak!, has finished loading type *GOTO 140*. The hidden music, Captain Pugwash, will start to play. It repeats in an endless loop so press Escape to stop it.

Unfortunately the music has been removed from the version of Frak! re-released by Superior on Play It Again Sam 4, so Captain Pugwash fans

determined to hear Orlando's implementation will have to track down a copy of the original.

Zalaga was the first offering from Aardvark Software and the first game written by Orlando after leaving Acornsoft. The BBC Micro and Electron versions were originally released a couple of years apart but both appear back-to-back on Beau-Jolly's 10 Computer Hits Volume 4.

The BBC Micro version does not feature music, but the Electron version features its own version of Captain Pugwash. The Electron game does not run on the bigger machine but the hidden music will play quite happily. Type LOAD"" and, when the first file – Zalaga – has finished loading type:

```
PROCpugwash
```

and the music will play.

Zalaga

Warehouse wonders

A couple of years ago a budget label by the name of Top Ten appeared on the BBC Micro software scene. It was run by former Audiogenic man Darryl Still – those with good memories may remember him as the source of the map and solution to ASL's ThunderStruck II that appeared in the second-ever Hac Man column in April 1987. Darryl will also be known to readers of this column as the Dax of Go-Dax, the label on which Skirmish was launched.

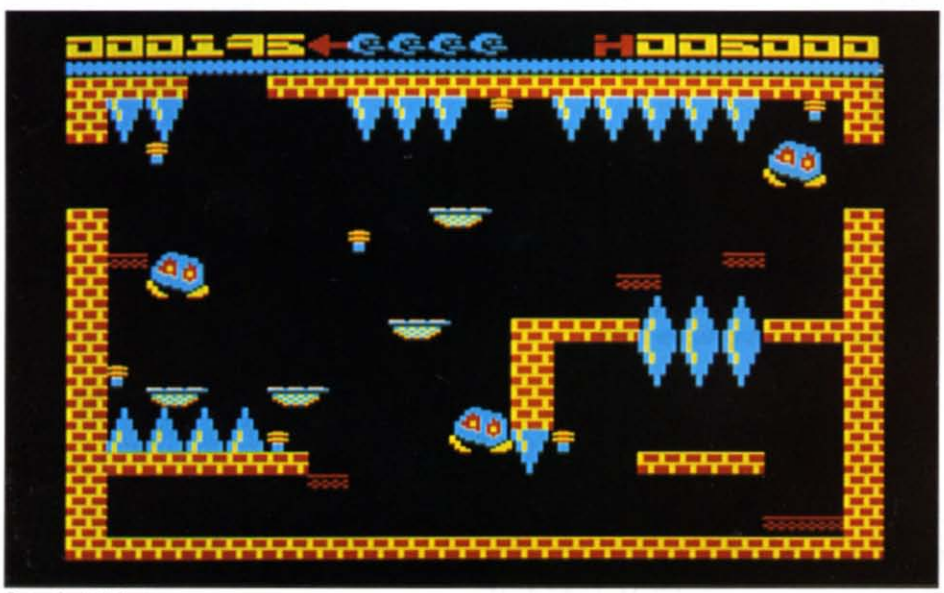
Although Top Ten is no more, the few titles released by the label during its brief life still survive – the Peter Scott Trilogy, three previously unreleased games from the early days of one of the finest programmers writing for the BBC, Gridiron, an American Football game, and the arcade-adventure Warehouse.

The latter was written by Philip Watts and Tim Bateman, a team who called themselves Pillar Graphics. The idea is to make your way around a 400 room warehouse in search of a dozen items to fulfil the orders of your six customers. Like Peter Scott's ThunderStruck, you can obtain some of the items by careful examination of your surroundings, while others can only be acquired by bartering with the customers.

Needless to say, the usual nasties appear on each screen as soon as you enter, so you need a fairly handy trigger finger. Each alien is, of course, faster on its feet than you and quite deadly to the touch. Each screen features a portal that will generate a new alien as quickly as you can shoot the existing one. Only when you destroy the portal will the aliens stop coming. This is normally easier said than done, because the portals are often located in an almost inaccessible corner of the screen.

This is where the cheat mode comes in... To

Turn to Page 39 ▶

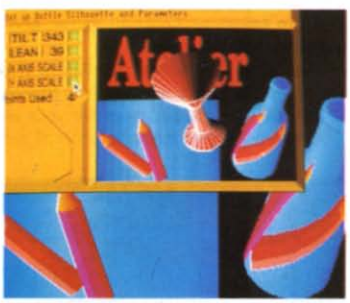

Peter Scott Trilogy

Problem corner

The step-by-step solution to level one of Ravenskull featured in the January 1989 issue of *The Micro User* proved very popular. However since then I've received many letters detailing difficulties with level three. Unfortunately I don't have a solution to this – can any reader oblige?

ATELIER

The definitive art package for the Archimedes



"- I didn't think that there was room in the market for another art package of any quality but I was wrong.....along comes "Atelier" from Minerva Software and what an art program it is!.....It takes the computer art program to a new level !" *(A & B Computing August 1989)* -

£99.95 inc. VAT

MINERVA SOFTWARE

69 SIDWELL STREET · EXETER EX4 6PH · TEL: EXETER 0392 437756 · FAX: 0392 421762

◀ *From Page 37*

activate it, first play the game normally until you qualify for inclusion in the high score table – over 1000. Enter your initials using the up, down and fire keys and you will be returned to the high score table. Now type:

```
10101052422A
```

exactly as shown. If you have entered the sequence correctly the game will start automatically and you will find that you are now completely invulnerable to the aliens' touch. If it does not start automatically enter the sequence again. You can now wander up to an alien with impunity, push past it, and blast its portal apart. Bingo! No more aliens.

Although Warehouse is nothing remarkable, it is nevertheless fun. I found that this cheat facility breathed a new, albeit brief, lease of life into a game that had spent the last year gathering dust on the shelf.

Ballistix preview

Although Peter Scott is now without doubt a veteran of the BBC Micro software industry, he is not content to rest on his laurels. Through my letterbox this morning, in the wake of The Last Ninja, Barbarian II and more recently Predator, has come **Ballistix,** a four-way scrolling game based loosely on the Crossfire of yesteryear. It is a conversion from the 16 bit game of the same name co-written by Martin Edmondson, who will be known to many BBC Micro owners for his part in Ravenskull and Codename:Droid.

Without going into too much detail, for the version I have is very much pre-release, the idea is to fire small balls at a central puck in order to propel it into your opponent's goal. Your opponent, who can be human or computer, is trying to do just the same to you. The game features 60 levels – 30 in one-player mode and 30 for two.

Although the play field is presently somewhat spartan, the finished version will include holes, bumpers, magnets and many other features more suited to a modern-day pinball table. There will also be bonus tiles that can give extra points, generate up to 12 extra balls, remove your opponent's firing ability, and so on.

Peter says that the game is very compulsive, especially with two players. I would be inclined to agree with him, but at half past three in the morning I have not been able to persuade even the dog to wake up and playtest it with me. Ballistix is definitely something a bit different: I look forward to the finished version.

Completely compatible?

Risc OS, the new and definitive operating system for the Archimedes, is an impressive piece of design and programming. When I attended an Archimedes programmers' seminar at the European Computer Show I was bowled over at the sight of a 440 with First Word Plus, a zooming Mandelbrot pattern, Zarch and a few other goodies all running simultaneously.

However, when any new operating system comes along to replace a reasonably well-established one there are bound to be a few problems with software written for the old OS turning out to be incompatible with the new. Most games currently available for the machine run without a hitch. However, **Quazer,** from Impact Software, does not.

I was notified of the problem by Walt Patterson of Amersham, Bucks, who says that as soon as you boot the game, whether from the DeskTop, Basic or from an OS prompt, the screen clears and the micro locks up with the following message:

I'm sorry, but this just isn't good enough. Please configure the screen size to be 20 AT ONCE and re-run this program. I don't know. Some people...

Unfortunately, in Risc OS Quazer gives this

Turn to Page 40 ▶

Unkillable skirmish

Readers of this column probably know how I have raved about **Skirmish**, so just to prove I can hold back, I won't say a word. Skirmish features a comprehensive set of playing instructions that appear on the screen while the main game code is loading, and describe, among other features, the "indestructible?" pterodactyl – their quotes, not mine. Christopher Harrison of Blackpool, Lancs has raised a point that I realise I've never mentioned: The pterodactyl is not indestructible at all, although very, very nearly so.

The only way to kill it is to ram your lance down its throat. Positioning yourself for such a strike requires literally pixel-precise accuracy, so don't expect to do it first time. However, if you do land your blow squarely in its mouth you will see it flicker out of existence, leaving behind a shimmering 1000 – the value of your bonus.

Happy jousting!

Infinite Reptons

The screen passwords for **Repton Infinity**, courtesy of Simon Guerrero of Gilsland, Cumbria, are as follows:

Repton 3 Take 2 – Part 1:
1
NGQGEHZO
SMLKURGB
UMZPTVTY

Repton 3 Take 2 – Part 2:
1
EWOYZGXZ
VHVBNPPW
PDLBDQCQ

Repton 4 – Part 1:
1
LKKZBKVL
RCOFLRYW
MWNNJHFF

Repton 4 – Part 2:
1
GPQRNGXE
INZTSUHR
KJKXGYID

Robbo – Part 1:
1
VCMKCNVR
FWPTDIYZ
DQCQMWZG

Robbo – Part 2:
1
LLMNSDGL
DBZGBUFU
CTRAYLAH

Trakka – Part 1:
1
SPDDEPCH
HPRCGTVH
WGSNEYHQ

Trakka – Part 2:
1
PDVJAFNA
QKUCTZGR
WLJMWJEN

Thank you Simon.

SERIES

◀ *From Page 39*

message when the screen size is already configured to 20 – 160k.

The explanation and solution are quite simple: Memory under Risc OS is allocated dynamically and if you use Mode 12 for the DeskTop – as is usual – only 80k of memory will be provided. In fact the ScreenSize command is virtually redundant and is only included for compatibility.

To run a game that uses either twin 80k screens or a single 160k one you need to call up the task management window and drag the memory allocation bar for the screen size until it reads the required amount. From here you can either double click the !boot file or enter Basic and issue a *EXEC!BOOT command. The same procedure will work with most games that give errors such as *Bad mode*.

While on the subject of Risc OS, it's worth mentioning that Pac-Mania specifically UNPLUGs two modules – SpriteUtils and Podule – and doesn't re-initialise them. Some software needs SpriteUtils and will either hang-up or result in *Bad command* errors. To get these modules back enter:

```
*RMREINIT module name
```

The most annoying thing about all this is that an RMKill command would do the same and isn't quite as permanent.

As a final point, hidden in the !Lander application is a module called MemAlloc which, when loaded, provides about six star commands that alter the memory allocations of the screen, system sprites, font cache and so on – other programmers please note.

Elixir's medicine

Another problem of hardware/software compatibility is that of **Elixir,** which appears on the disc version of Superior's Play It Again Sam 5 compilation, and faces an apparent nemesis in the form of the Watford Electronics DFS.

When you press Shift+Break to boot the disc the machine will display Elixir's title page after a few seconds, then go on to load the file that contains the instructions. However as soon as this file has loaded the machine crashes with the message:

```
Channel
Bad
program
```

The solution is fortunately simple. Just type *RUN TITLE – which is, incidentally, the last command in the !boot file – and it will run perfectly.

ARCHIMEDES

A3000 Now available £746.35

	Basic	Colour
A310	£1033.85	£1286.85
A310M	£1102.85	£1355.85
A410/1	£1378.85	£1631.85
A420/1	£1953.85	£2206.85
A440/1	£2873.85	£3126.85

Archimedes with Colour Monitor
Ring for Special Price !!!

We are now giving a voucher for 10% of the value you spend on all NEW Acorn computers That means if you buy a 410/1 colour you will receive £163.18 to spend on anything

Master 128	£504.85
Cambridge Z88 Lap Top	£267.37
Second/User BBC Bs from	£199.00U
Master Turbo Module	£80.50U
Used Archimedes A310M Basic	£795.00U

MONITORS

Philips 8833 colour	£275.82
Philips 8801 colour	£194.95
Philips 7502 Green	£83.65
Microvitec 143	£211.64
Microvitec 1431	£149.50U
Microvitec 1441	£230.00U
Tatung Colour Std/Res	£175.00

PRINTERS

Panasonic KX P1081	£169.00
Panasonic KX P1082	£243.80
Citizen 120D	£149.50
Epson LX800	£268.80
Epson LQ800	£539.05
Micro P 135+	£159.36
Seikosha SP180AI	£138.00

NIDD VALLEY PRODUCTS

Digimouse mouse only	£32.78
Digimouse+Graphic	£35.91
Digimouse+Illustrator	£40.39

We specialise in Trading in and buying Used Hardware & Software Anything we have for almost Anything you have. NEW LAMPS FOR OLD !!

LASER PRINTERS

Epson GQ3500 laser	£999.99

VARIOUS HARDWARE

ATPL Sideways ROM Board	£41.50
Cambridge Z88 32K RAM	£18.95
Cambridge Z88 32K ROM	£18.95
Cambridge Z88 128K RAM	£47.43
Cambridge Z88 128K ROM	£47.43
Cambridge Eprom Eraser	£37.95
Cumana Touch Pad	£34.50U
Graph Pad	£69.00U
Morley AA Board	£43.64
Pace Nightingale Modem	£69.00U
Ferguson TV tuner	£55.00
Vine Micros ROM Board 4	£26.94
Watford Aries B32	£58.99U
Watford 16K Disc RAM	£23.00U
Acorn Data Recorder	£13.80
Viglin Data Duck	£11.50U
Watford Video Digitiser	£85.00U

ADVANCED MEMORY SYSTEMS

AMX Design	£46.00U
AMX Art+Paintbox	£25.00U
AMX Mouse+Superart+OS	£46.00U
AMX Desk	£15.00U
Extra Extra!	£15.00U
AMX Stop Press	£33.00U

DATABASE SOFTWARE

Mini Office disc 5.25	£12.70
Mini Office disc 3.5	£16.45

PRES

Adv. Control Panel	£32.08
Adv. Disc Investigator	£26.73
Adv. Disc Toolkit	£32.08
Adv. File Manager	£25.87

All PRES products less 10%

PERMANENT MEMORY SYSTEMS

Genie in a Box	£71.41
Genie Junior	£22.49
Genie Master Cartridge	£71.41
Genie Utilities	£8.94
Genie Real Time Clock	£26.08
6502C 82P Sec Processor	£80.95

We Stock ALL the popular and unpopular games both new and used from as little as
£1.50
The above are just a few of the items we have Please telephone or send a SAE for up to the minute prices

DISC DRIVES

No PSU Drives

Ahkter 40/80 400K Single	£118.95
Ahkter 40/80 800K Dual	£229.44
Cumana CSX400 Single	£138.54
Cumana CDX800S Dual	£256.45
Pace PSD3 Single	£137.13
Pace PDD3 Dual	£254.86
Single Drives 40/80T	£98.90
Dual Drives 40/80T	£191.73

With PSU Drives

Ahkter 40/80 400K Single	£131.69
Ahkter 40/80 800K Dual	£276.20
Cumana CS400 Single	£161.95
Cumana CD800S Dual	£305.94
Pace PSD3P Single	£161.71
Pace PDD3P Dual	£302.73
Single Drives 40/80T	£124.68
Dual Drives 40/80T	£216.59

ACORNSOFT

Fortran 77 Archimedes	£69.00U
Logo	£39.00U
ISO Pascal ROM	£55.20
Lisp	£18.40
Logistix (Archimedes)	£102.46
Micros in Business	£39.95
Twin (Archimedes)	£30.00
View 3.0	£47.84
View Index	£11.96
View Plot	£23.95
View Professional	£79.94
View Sheet	£47.84
View Spell	£23.00
View Store	£36.80U
BCPL Roms	£36.00
Hi View	£23.50U

WIGHT SCIENTIFIC

Wight Signwriter	£26.94
Fonts for Above	£5.11

BEEBUG SOFT

Toolkit Plus	£20.70U
Help	£11.50U
Printwise Disc	£20.70U
C Language	£39.00U
C Stand Alone Generator	£13.80U
Rom It	£23.00U
Word Ease	£13.80U

*We stock the complete range Beebug Soft all Discounted

*All Prices in this Advert include VAT at 15% Post and Packing charges £1.00 for light items £2.45 for medium items. Expensive products £8.50 for courier service. * Items marked U are used stock **

MINERVA SYSTEMS

System Delta+Card Index	£58.45
Deltabase (Archimedes)	£17.25U
System Delta Plus (Arch)	£62.95
System Delta +Card Index	£39.00U
Accounts Packages all 10% Dis.	

CLARES MICRO SUPPLIES

Alpha Base (Archimedes)	£44.94
Artisan (Archimedes)	£35.95
Toolkit (Archimedes)	£35.95
Brom BBC	£11.50
Macrom	£17.25U
Artroom	£13.80U
Fontwise 3.5" package	£30.59

COMPUTER CONCEPTS

Inter-Base	£55.20
Inter-Chart	£29.44
Inter-Sheet	£45.08
Inter-Word	£34.50U
Inter-Chart (Archimedes)	£23.00
Inter-Sheet (Archimedes)	£35.88
Inter-Word (Archimedes)	£35.88
Mega 3 ROM	£87.99
Spx II Master	£47.19
Wordwise Plus	£30.00U
Disc Doctor	£13.80U
ROM podule Arch Bat/Bk	£64.44

DABS PRESS

Master Guide Book	£11.65
Viewstore/Sheet Book	£11.65
View Guide Book	£11.65
Hyperdriver	£19.95U
Program Discs for books	£7.14
Hyper Driver	£26.49

VINE MICROS

Replay Tape to Disc	£26.91
Romboard 3	£17.94
Romboard 4	£26.94
Write Protect Switch	£8.05

COMPUTECK Ltd. Dept.(MU) Dinting Lane Industrial Estate Glossop Derbyshire SK13 9NU

VISA/ACCESS telephone 04574 65953

Computeck Ltd, are now probably the major source for second user Acorn Hardware and Software, at present we have approximately 1500 items for Acorn computers (We even have used Archimedes software!)

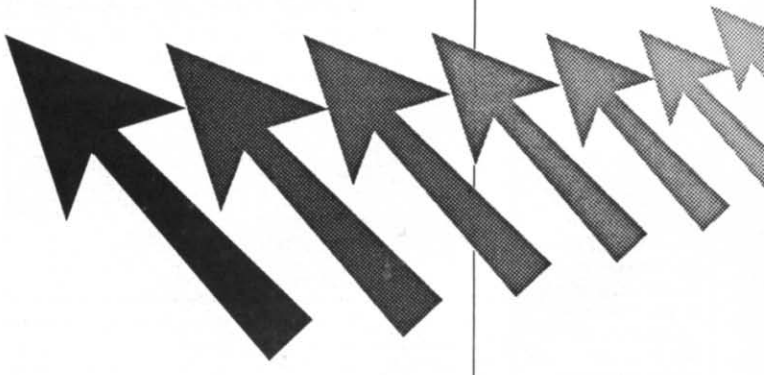
If you buy for yourself, your business or your school surely it makes sense to save money by purchasing fully tested used products at keen prices.

We are able to trade in Acorn equipment against almost any other computer, i.e Amstrad, Commodore, Atari, Samsung, AST, Olivetti, IBM etc. etc.

So Remember

IF YOU USE A COMPUTER DON'T FORGET TO USE COMPUTECK

Don't forget to shut the windows



Ken Down winds up his series on Wimps by tying a few loose ends

WE'LL use in this last article of the series, what we already know about the Wimp to add the Delete and OS command routine. In fact, if you have been following the articles regularly you may even have been able to add them yourself.

If you haven't managed it, the first step is to put a line in the menu decoding procedure to respond to clicks on the delete option:

```
1650 WHEN3:PROCdelete(poll%!4,poll%!8)
```

PROCdelete is rather more complicated than the usual routine to set up a dialogue box because there are three delete options – for an entry, an account or a complete area. The first is fairly straightforward, but the other two require you to make further selections from the sub menu, all of which must be decoded and the appropriate action called.

The first line deals with the situation where the user has clicked on the delete option in the main menu, not on any of the sub menus. In such a case poll%!4 would contain the value -1, so we create the usual alert box with the message *Invalid Selection*.

In the same way the second line sends the same signal if the first sub option is clicked rather than the sub-sub menu. However, if the area has been properly selected from the sub-sub menu we do not immediately act to delete the whole area. Instead the program creates the *Warn* dialogue box:

```
12100 DEFPROCdelete(opt1%,opt2%):IFopt1%=-1PRO
Ccreatealert("Invalid Selection"):ENDPROC
12110 IFopt1%=0IFopt2%=-1PROCcreatealert("Inva
lid Selection"):ENDPROC
12120 IFopt1%=0area%=opt2%:PROCcreatewarn("Del
ete "+a$(opt2%)+"?")
12220 ENDPROC
```

PROCcreatewarn is almost identical to the procedure to create the *Alert* dialogue box:

```
3600 DEFPROCcreatewarn(m$)
3610 oldmbx%=mbx%:oldmby%=mby%:oldmtx%=mtx%:o
ldmty%=mty%
3620 $alertm%=m$:len%=LENm$:RESTORE20600:dial
og%=FNcreatedialog(6):ENDPROC
```

The data is very similar except that the minimum size is larger – 400 as opposed to 200 in line 20600 – to allow for two buttons instead of one and that it uses the sprite *warn* instead of *stop*. This is the warning triangle sprite you created a few months ago and have probably almost forgotten.

The really important difference, however, is that this dialogue box has two buttons – one for Continue and the other for Cancel. As deleting is rather final, the Cancel button is highlighted in yellow while the Continue one is a dull grey:

```
20600 DATAwarn,4,200+FNgreater(16*len%,400),200
20610 DATA190,30,350,70,15,0,&303D,Continue
20620 DATA380,30,540,70,3,0,&303D,Cancel
20630 DATA40,55,1,1,6,0,2,warn
20640 DATA180,100,180+16*len%,140,6,0,&119,al
ertm%,len%
```

We have to create a special function – FNclickdialogwarn – to deal with clicks to this dialogue box. If you click anywhere except over one of the buttons the value of icon is -1, so the function returns a value of FALSE.

If you click the Cancel button, which is icon one, the function returns the value TRUE, but takes no further action. Only if you click icon zero, the Continue button, do things start to happen. As the value of *area%* has been set back in line 12120 the function calls PROCdeletearea.

You will notice that this prevents you deleting

Turn to Page 42 ▶

◀ *From Page 41*

area zero, which in my program is Banks. If you want to delete it you will have to set up the program a little differently and have some such statement an *area%>-1* test.

```
12400 DEFFNclickdialogwarn(icon%):IFicon%<0 =F
ALSE
12410 IFicon%=1 =TRUE
12470 IFicon%=0IFarea%PROCdeletearea
12480 =TRUE
```

PROCdeletearea itself is very simple. It scans through each of the records using two variables – *i%* and *j%* – to keep track of progress. If an entry is found that matches the area to be deleted, *j%* is increased by two to skip over the entry – and its corresponding value – which are thus effectively deleted.

When *j%* reaches the total number of entries – *L%* – the loop ends and *L%* is set to *i%*. Finally, if the balance window is open we resize it to fit the smaller number of entries, reset *area%* to zero and end the routine. What could be simpler?

```
12700 DEFPROCdeletearea:i%=0:j%=0
12710 WHILEj%<=L%:IFASC(LEFT$(r$(j%),1))=area%
REPEAT:j%+=2:UNTILASC(LEFT$(r$(j%),1))<>area%
12720 r$(i%)=r$(j%):r$(i%+1)=r$(j%+1):i%+=2:j%
+=2
12730 ENDWHILE
12740 L%=i%-2:IFbal%PROCresizewindow(bal%,0,0,
1224,L%*32)
12750 area%=0:ENDPROC
```

We follow much the same sort of procedure when the user wants to delete an account. Again we deal first with clicks in the sub-menu instead of the sub-sub menu.

If the correct selection has been made we set a couple of variables and then create another dialogue box to select the particular account that is to be deleted:

```
12130 IFopt1%=1IFopt2%=-1PROCcreatealert("Inva
lid Selection"):ENDPROC
12140 IFopt1%=1THEN
12150 dar%=opt2%:dac%=&FF:RESTORE20500:dialog%
=FNcreatedialog(7)
12160 ENDIF
```

The data is almost identical to that for the new account dialogue box in lines 20000-20050 except that no writeable icon is involved.

```
20500 DATAdelete,4,532,900
20510 DATA290,600,498,680,7,0,&303D,OK
20520 DATA290,400,498,480,3,0,&303D,Cancel
20530 DATA40,24,250,880,7,0,&303D,FNnewacc(da
r%,&3039)
20540 DATA290,800,498,860,1,7,&303D,a$(dar%)
```

As usual, clicks in a dialogue box are handled by FNclickdialog+claim$, which in this case is set to *delete*. The first two lines deal with clicks outside buttons or icons and clicks on the Cancel button. Clicking on one of the account names results in that icon being inverted, a process which can be repeated as often as you wish. The program uses the last icon clicked on.

Lines 12530 onwards deal with clicks on the OK button. If no account has been selected an alert box is created. If all is well a process very similar to that for deleting an area is initiated, except that this time we have to match both area and account numbers.

```
12500 DEFFNclickdialogdelete(icon%):IFicon%<0=
FALSE
12510 IFicon%=1PROCclosewindow(dialog%):dialog
%=0
12520 IFicon%>2IFicon%<24dac%=icon%-3:PROCinve
rticon(dialog%,icon%):=FALSE
12530 IFicon%=0IFdac%=&FFPROCcreatealert("Whic
h account?"):=FALSE
12540 IFicon%=0ANDdac%<&FFTHEN
12550 i%=0:j%=0
12560 WHILEj%<=L%
12570 IFASC(LEFT$(r$(j%),1))=dar%IFASCMID$(r$(
j%),2,1)=dac%THEN
12580 REPEAT:j%+=2:UNTILASC(LEFT$(r$(j%),1))<>
dar%ANDASCMID$(r$(j%),2,1)<>dac%
12590 ENDIF
12600 r$(i%)=r$(j%):r$(i%+1)=r$(j%+1):i%+=2:j%
+=2
12610 ENDWHILE
12620 L%=i%-2:IFbal%PROCresizewindow(bal%,0,0,
1224,L%*32)
12630 ENDIF
12640 =TRUE
```

The final part of the routine deletes a single entry. For this we create a window display identical to the balance sheet and the user selects the unwanted entry from it:

```
12170 IFopt1%=2THEN
12180 del%=FNcreatewindow("Delete",&F,0,7,1224
,L%*32,0,0,1280,1024,0)
12190 PROCopenwindow(del%,block%)
12200 w%=FNwhich(del%):window%(w%,0)=&FF
12210ENDIF
```

Once this window has been set up we handle clicks in it from PROCmousebuttonclick.

```
2680IFdel%=handle%PROCclickdelete
```

The first step is to decipher the mouse click and determine which is the doomed entry. Furthermore, as entries go in pairs and as the mouse may be over either one of the pair, we have to make sure that we pick the first entry of any one pair. The victim is indicated by *de%*:

```
12300 DEFPROCclickdelete:PROCwaorigin(block%,
x%,y%):de%=(L%-1-(poll%!4-y%)DIV32):de%-=(de%M
OD2)
12310 PROCsplit(de%):account%=TRUE:PROCcreatew
arn("Delete "+detail$+"?"):ENDPROC
```

Once again, we create a warning box and it is the function FNclickdialogwarn that does the dirty work. That's all there is to it.

```
12420 IFicon%=0IFaccount%THEN
12430 FORi%=de%TOL%:r$(i%)=r$(i%+2):NEXT
12440 L%-=2:account%=FALSE
12450 PROCclosewindow(del%):del%=0:IFbal%PROCr
esizewindow(bal%,0,0,1224,L%*32)
12460 ENDIF
```

And so to the very last routine of all, a very simple couple of procedures to allow operating system star commands such as *CAT, *MOUNT,

The complete working version of the accounts program built up in this series is on this month's disc which is sent free to all subscribers. For details of our subscription offer see Page 118

*CDIR and so on. One of the advantages of the Archimedes is that you can format, backup and even *COMPACT a disc without corrupting the program and variables that are in memory. Add the following lines to the menu decoding procedure

```
1700WHEN8:PROCoscli
1710ENDCASE
1720ENDPROC
```

PROCoscli is simplicity itself.

```
12800 DEFPROCoscli:RESTORE2070:dialog%=FNcreat
edialog(7):ENDPROC
```

The data for this dialogue box is just three lines.

```
20700 DATAoscli,2,1279,970
20710 DATA332,80,492,124,3,0,&303D,Continue
20720 DATA732,80,892,124,15,0,&303D,Execute
```

This means that we must have an FNclickdialogoscli to do the actual work:

```
12900 DEFFNclickdialogoscli(icon%):IFicon%<0 =FALSE
12910 PROCinverticon(dialog%,icon%)
12920 IFicon%=0 =TRUE
12930 MOVE0,1000:OSCLI($mtext%):=FALSE
```

And there you have it. This program offers many opportunities for expansion – a printout option is perhaps the most obvious missing routine. However the purpose of this series has been to teach you about the Wimp Manager not Basic programming. By now you should have enough information to enable you to add whatever routines you want.

Since the beginning of this series Acorn has produced Risc OS which, when it was still on the drawing board, was going to be completely different. Instead, the multi-tasking Wimp is an upgrade of the earlier version on which this series of articles has been based.

To see examples of the new system at work you can double-click applications like !Alarm and !Patience with Shift pressed to reveal the contents of the directory. From Basic you can issue:

```
LOAD $.!Alarm.!RunImage
```

to load the main program file for closer examination.

So now you're all set to produce your own Wimp programs – and, with a little work of your own with the supplied applications, you'll be able to write multi-tasking DeskTop accessories. Have fun.

NEW! for the BBC Micro, Electron & Archimedes

NOW WITH UPDATED DICTIONARY

KEYWORD

The dynamic word finder for home and business use

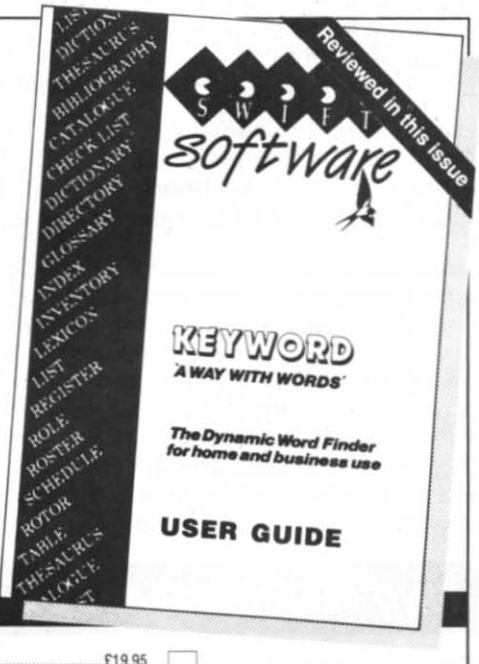
Now you need never be stuck for a word again because Keyword contains dozens of synonyms for over 10,000 words.

And it's so easy to use. Just type in a word and straight away you'll be offered a huge list of alternatives. Then simply select the word that's nearest to your liking.

Or if it's not exactly the one you're looking for, you can automatically select another, more closely, related set of words – and so on.

With Keyword you'll be able to quickly and effectively make use of the wealth of the English language, and once you've used it you'll wonder how you ever managed without it.

- Easy to use
- Over 10,000 synonyms and antonyms
- Nearly 1,000 main subject headings
- Extra rapid word search
- Works with Arthur 1.2
- Fully Risc OS compatible
- Can select over 70 words at a time
- Simple operation
- Flexible 'roam' facility
- Can be used as a Thesaurus



Watch offer extended – for one month only

Special Introductory Offer
SAVE £4.95

We will send one of these superb calculator watches, worth £4.95, to the sender of every order for Keyword we receive before 31st August, 1989

In case of high demand we reserve the right to replace this watch with one of equal or better value

ORDER FORM

Please send me Keyword for the following:

BBC Micro 5.25" 80T DFS ..... £19.95 ☐
BBC/Electron 3.5" ADFS ..... £19.95 ☐
Archimedes ..... £29.95 ☐

I enclose a cheque/Euro cheque/PO made payable to SWIFT SOFTWARE.

Name .....

Address .....

.....

Post Code ..... Tel: .....

Swift Software, MU9,
347 London Road,
Hazel Grove,
Stockport,
SK7 6AA.
Tel: 061-456 0926

Look what's waiting for you ... when you join the fastest growing electronic mail service of all!

Four years' continual development have made MicroLink into the COMPLETE communications and information system for everyone with a home or business computer.

And it's so easy to use. From your keyboard, linked to a modem and phone, you can directly key into an ever-growing range of services, both in Britain and around the globe.

Every day thousands of electronic mail messages pass between MicroLink subscribers throughout Britain . . . and many other parts of the world. From their keyboard they can also send telex and fax messages, without the need to buy expensive equipment.

MicroLink can be used with ANY computer, from a tiny hand-held Psion Organiser or Z88 portable to the most sophisticated computer of all. And from anywhere where there is a telephone point.

So if you want to speed up your mail, tap into a weather satellite, carry out company searches, obtain free legal and financial advice, order flowers, book theatre tickets, negotiate a mortgage, help yourself to free telesoftware programs – or go adventuring in the land of Shades, the world's biggest multi-user game – then there's only one answer – MicroLink.

One number to dial
one security password
one simple log-on
and you're only a
keystroke away from
the best information
and entertainment
services now available.

FIND OUT MORE ABOUT MicroLink

Please send me more facts about MicroLink

Name _____

Address _____

_____

_____

Send to: ***MicroLink, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.*** MU9

Use MicroLink FREE* for a month!

When you send in the form alongside you will receive a unique invitation to join MicroLink, with FREE registration and telex validation (normally costing £15), and a month's FREE* use of your MicroLink mailbox. So you can find out for yourself what MicroLink is all about without it costing you a penny.

* This exclusive offer relates to time and character charges only and does not include third party surcharged services.

Product: TechnoCAD
Price: £115
Supplier: Technomatic, Techno House, 468 Church Lane, London NW9 8TQ.
Tel: 01-205 0190.

Draughting on the Master

Steve Bruntlett explores a new force in computer aided design

TECHNOCAD is a rom and disc-based draughting and design package for the Master and comes from Technomatic, the company that produces the excellent Novacad, the standard system in many schools and colleges. The package consists of a cartridge with the rom already in place, a utility disc and an easy to read manual. The first section of the three part manual consists of an introduction to CAD, an overview of the system, some brief instructions and a couple of drawing tutorials with illustrated examples.

The second part has detailed descriptions of each of the pop-up menus which cover the drawing environment as well as installation and disc usage instructions.

The third section contains instructions for using the toolkit which provides control over the program environment by configuring the program to work with your hardware, among other things. There is also a series of useful Help pages at the end of the manual concerned with the system and printing or plotting problems.

Drawing a house: Part of the TechnoCAD tutorial

TechnoCAD is designed to provide all the functions of a good CAD system and makes effective use of the Master's facilities and its 128k ram. Shadow memory is used for screen displays and sideways ram for storing diagram and icon data.

Technomatic claims that TechnoCAD will allow both experienced and novice draughtsmen to produce accurate, detailed diagrams easily, though I'm not sure it's as straightforward as that. The software can be controlled by keyboard, mouse or tracker ball. Only three keys are needed for input, with single key commands and pop-up menus making it an easy system to use.

Lines, arcs, circles and icons can be drawn, edited, moved or erased and the thickness and colour can be altered. There's a user-definable grid and scale, together with an onscreen display of dimensions and a coordinate system to aid accurate drawing. Diagrams up to A0 size can be created.

There are eight levels for drawing – surely standard by now on all good CAD packages. It's really a set-up for an eight pen plotter, and output from a printer is a compromise in terms of size and quality.

TechnoCAD provides access to disc-based libraries of icons, and ones used in a diagram are saved with it. Icons can be called from disc or ram using predefined function keys.

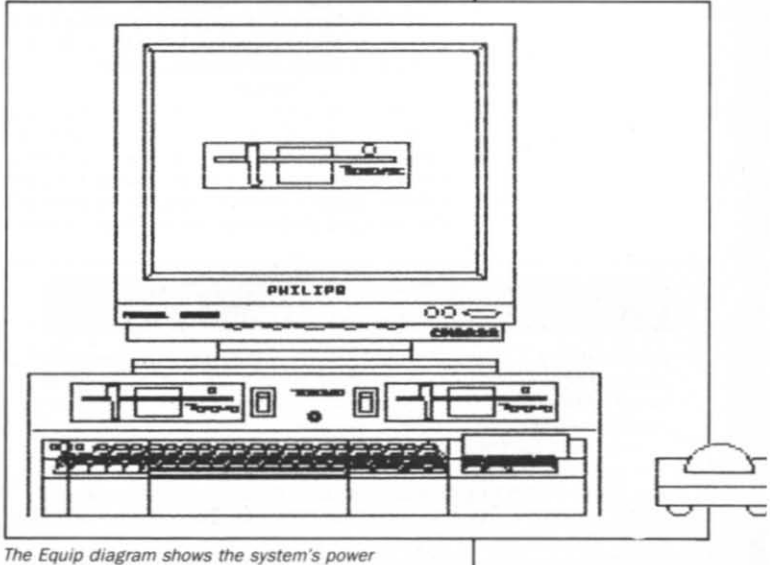
The screen display has been kept simple by using a small cross-hair cursor to mark the ends of lines and centres of circles and so on. A series of pop-up menus provide access to the drawing facilities. The screen is a window which can pan across a much larger drawing area.

When you start the screen display represents the best fit on an A4 sheet of paper for plotting purposes. This allows a one-to-one correspondence between screen and plotter paper.

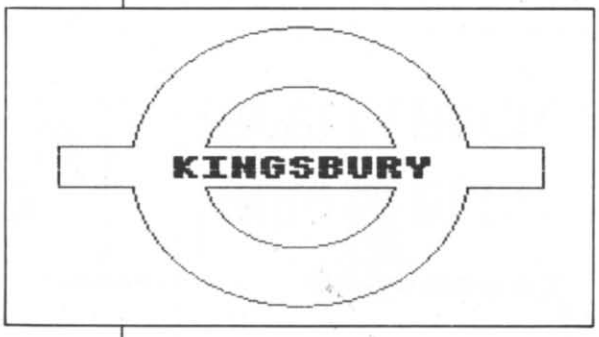
The cursor coordinates are given above the top left of the drawing area and the border below it is used to display information relating to the current activity. When you first start using TechnoCAD the screen will be blue with a cyan frame and white text. These defaults can be changed easily using the set-up configuration option under the toolkit menu.

After inserting the rom cartridge, switching on and booting the disc, you can read or print four

Turn to Page 46 ▶



The Equip diagram shows the system's power



Going underground with TechnoCAD

◀ *From Page 45*

pages of readme files before the software reads the disc configuration files and the first pop-up menu appears.

Selecting the default option, TechnoCAD produces a new menu with four options: Current, New, Load and List diagrams. Using the cursor keys you can move the highlight bar on to the New Diagram option. After being asked for a name for it the screen displays a blue cross cursor in the centre with its vertical and horizontal coordinates at the top left of the screen outside the drawing area.

Pressing Return calls up the main menu which has options for draw, modify, zoom, icons, attribute, pan, files, hard copy, set up, block delete, exit, restart and star command. Most have further pop-up menus, so there is plenty to explore.

I have found that when starting with any new program it's a good idea to see if you can print out the examples provided to make sure you can get some kind of output. If the software is well written you should be able to print out or plot such examples without much recourse to the manual, though with such an extensive package you might need to look up a few references, as I did.

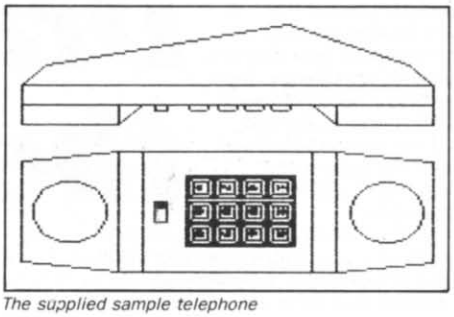
'TechnoCAD is designed to provide all the functions of a good CAD system'

The example I chose was *Plan1* which should be familiar to users of Novacad. Although listed in the manual along with diagrams of the two sets of pop-up menus, it wasn't on the disc. The readme notes which I printed out at a later stage gave a largely different list of diagrams including a telephone, a limited football pitch, a London Underground sign and the worked example of the house from the manual.

Printers supported by TechnoCAD are the Epson FX80, FX800, LQ850 and LQ1050 – plus any compatibles – with the capability to output in landscape or portrait format. Plotters include Hitachi, Epson, Penman, Hewlett Packard and Plotmate and Plotmate M series. There is also a plotter driver generator if your particular machine isn't in the above list. I didn't have immediate access to one, so I can only review the printer output which, for any CAD package, comes a poor second.

Setting up TechnoCAD to work with an Epson-compatible Canon PW1080A dot matrix printer proved a long and laborious process as I had to take the machine apart to change a DIP switch to provide auto line feed. I also had to sort out the Master configuration, specifically the Print and Ignore options, to get a print out at all. The screen dump option works very quickly, but is rather small, and was used for the illustrations. The other reason is that complex diagrams cannot be printed in sufficient detail at such a small size.

The printing out procedure involves using the TechnoCAD Set Up option to tell it which printer to use. It's a straightforward process as long as you have details of the cursor position and the zoom scale size. Progress through the options within the pop-up menus is also simple, with the ability to print part or the whole diagram, print out sideways or enlarge and redraw to print out details at a larger scale.



The supplied sample telephone

I was disappointed by the quality of the diagrams on the supplied disc. There was only one of any consequence, Equip, which really showed the power of the system. When enlarged details are replotted, part or all of the chosen section of the diagram may be off screen and you may have to use the pan option to get it into position. The enlargements of details of the Equip diagram may give you some idea of the kind of detail you might achieve on a plotter.

General control of the program menus is achieved by use of Tab, Return and Delete if using the keyboard. Tab marks the current cursor position to draw or keep an item. Return calls pop-up menus and selects from the menu and Delete ends an activity or rejects an item. Menu selection is via a highlight bar and pressing Return to select the option.

The drawing tutorial deals with the construction of a house from pre-defined icons and a partly drawn outline supposedly available from the utilities disc. The diagram supplied on my copy of the utilities disc was a complete one and not the partially constructed one referred to in the tutorial.

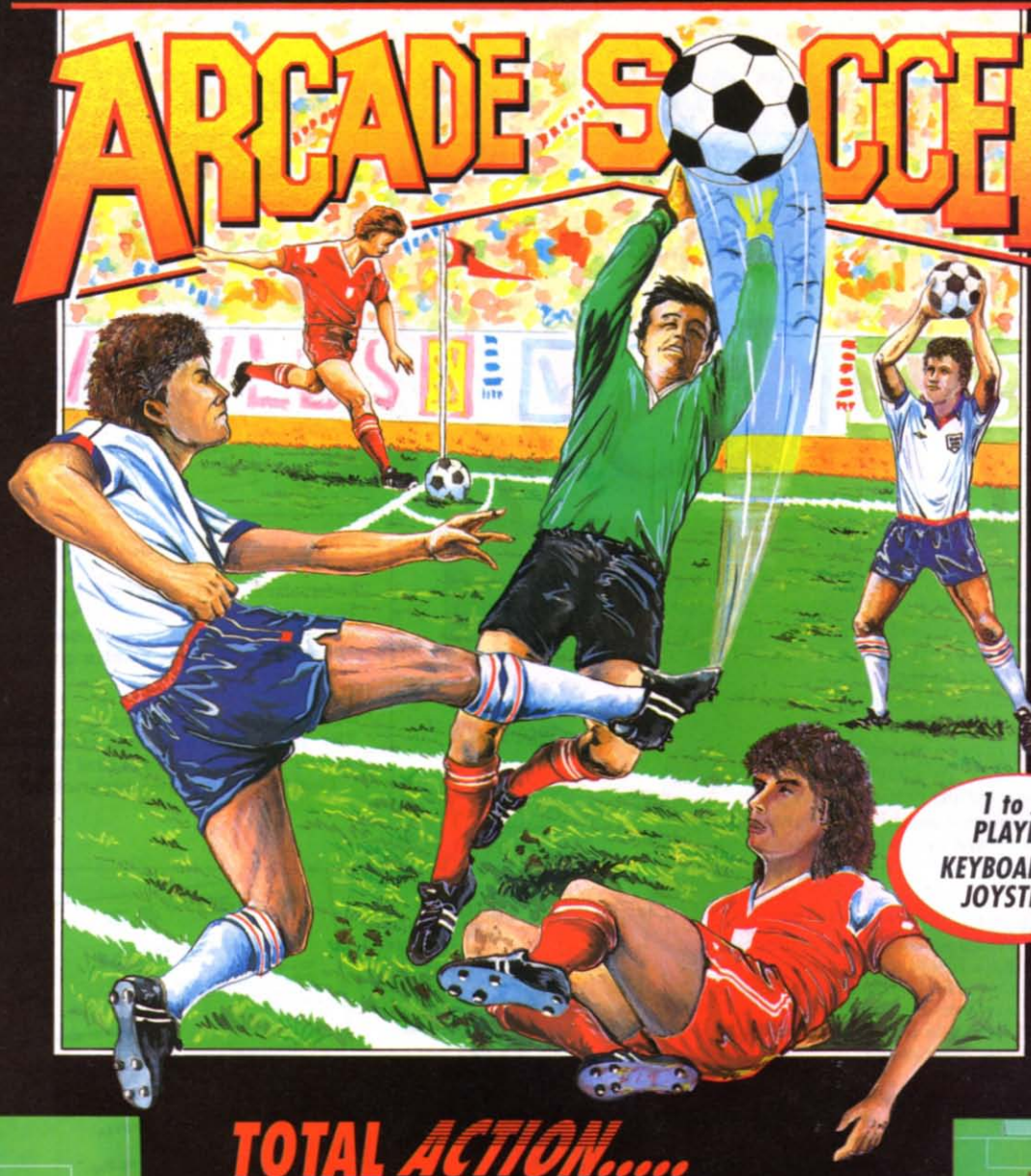
Parts two and three of the manual deal with the two sets of menus in detail. It is provided for reference purposes, though having worked with TechnoCAD for a week or so it might not be a bad idea to work through all the options before you start.

Summing up

I found it very difficult to do full justice to this very extensive CAD package in a single review. So many options are available that it would need a lot of use before it could be reviewed with the benefit of practical experience. It seems to do most things in a clear and concise way, but there are a few points which need attention.

It should be a perfectly good system for most school CAD work but you need a plotter to get the best out of it. I'm not sure whether it's up to the standard of the increasingly professional CAD software found in colleges and polytechnics.

ARCADE SOCCER



1 to 24 PLAYERS
KEYBOARD OR JOYSTICKS

TOTAL ACTION..... TOTAL CONTROL

Arcade Soccer really is football action at its very best. Using an overhead view to make gameplay as exciting as possible it features everything that you could want in a football game. Corners sliding tackles, throw-ins, goal kicks, dribbling, shooting, passing and much more. But not only does Arcade Soccer give you Total Action it also puts you in Total Control.

Firstly you can play with either keyboard or joysticks, against the computer and/or with up to 23 friends. The options are almost limitless; you can choose the skill of the goalkeepers, the speed and length of the game, play "friendlies" or tournaments and even enter the most coveted of championships - the World Cup.

Arcade Soccer lets you control the action - "It's brilliant."

HOW TO GET ARCADE SOCCER

Arcade Soccer is available now from most good games outlets. If there isn't a stocklist near you then we offer an instant mail order service.

Simply send us a quick letter telling us the version you require, your name and address, and payment via cheque, postal order or Access/Visa details. Your copies of Arcade Soccer will be sent by First Class Post on the SAME day we receive your letter. We pay the postage and packing (overseas add £3).

Telephone orders with Access/Visa are also welcome.
24 Hour Answering Service, 7 days a week.,

ARCADE SOCCER PRICES

BBC B/Master Cassette	£9.95
Acorn Electron Cassette	£9.95
BBC B/Master 5¼" Disc	£12.95
Master Compact 3½" Disc	£13.95
Archimedes 3½" Disc	£19.95

The above screenshots are taken from the BBC and Electron versions. The enhanced Archimedes version will be available mid October.

The Fourth Dimension, P.O. Box 4444, Sheffield. Tel: (0742) 700661 VISA

The Fourth Dimension

Create the right impression with

FontStyle

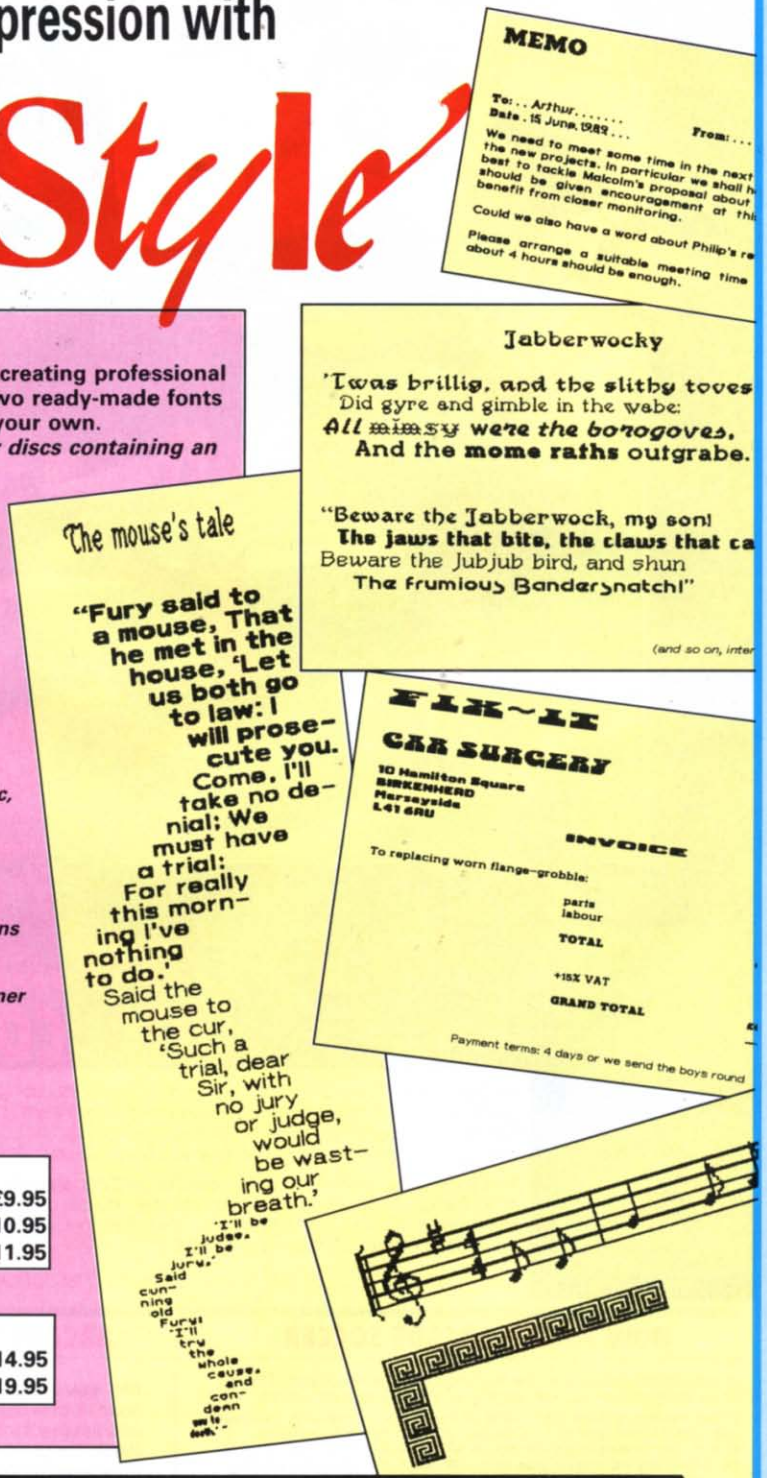
Fontstyle is a versatile system for creating professional looking printouts. It comes with two ready-made fonts and a designer so you can create your own.
Plus you can now get a set of four discs containing an extra 64 fonts!
FontStyle is so easy to use. You just type in your text using your favourite word processsor – enter the easy-to-remember formatting codes and save it. Then just load in the Fonstyle program and you'll have superb results within minutes.

Some of Fonstyle's features

- *Professional-looking results from 9 pin printers upwards*
- *Can print characters, borders, music, patterns and much more*
- *Simple to use*
- *Fast draft mode*
- *64 fonts*
- *Up to 8 fonts in any paragraph*
- *Print any font in different dimensions*
- *Temporary or hanging indents*
- *Dynamic control over page layout*
- *Flexible and easy-to-use font designer*
- *Ideal for letterheads, invoices, newsletters, memos and so on*
- *All popular word processors supported*

Fontstyle	
5.25in disc	**£9.95**
3.5in disc (BBC ADFS)	**£10.95**
Archimedes	**£11.95**

Set of 64 Fonts (4 discs)	
5.25in discs	**£14.95**
3.5in discs (BBC/Archimedes)	**£19.95**


MEMO
Jabberwocky
'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.
"Beware the Jabberwock, my son!
The jaws that bite, the claws that ca
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"
The mouse's tale
"Fury said to a mouse, That he met in the house, 'Let us both go to law: I will prose-cute you. Come, I'll take no de-nial; We must have a trial: For really this morn-ing I've nothing to do.' Said the mouse to the cur, 'Such a trial, dear Sir, with no jury or judge, would be wast-ing our breath.'
FIX-IT
CAR SURGERY
INVOICE
TOTAL
GRAND TOTAL

Send for your copy today, using the form on page 119

Crystal Sea search

Dive into Rob Walmsley's type-in game and take up deep-sea treasure hunting

LONG ago a merchant ship laden with huge jars of diamonds from the East ran on to a reef. Water began to flood in and although the sailors began to throw their precious cargo overboard their plight became hopeless and the vessel sank leaving only one survivor to tell the tale.

Ages passed and the story became a legend. But now the wreck has been found and you have come to recover perhaps the greatest sea treasure of all time.

The water is very deep and you have to use a remote-controlled droid to pick up each gem scattered across the sea floor, avoiding huge octopi intent on pulling your droid to pieces.

The machine needs two preset teleporters to jump up or down – any drop of more than one level causes its pressure hull to crack and it explodes.

You control the droid's movement with Q/A – left up, left down – and P/L – right up, right down. No other controls are needed as the droid automatically collects the gems as it passes over them.

Type in the listing and ensure it is correct using the checksums. If necessary the program relocates itself, so it is important to save it before running. As all the delay loops are time-based the program is suitable for all BBC Micros and Archimedes.

The landscapes are built up using blocks drawn using a standard 3D technique. The back is drawn first then the areas in front of it and so on. If a block is completely invisible it isn't plotted at all.

Once you've mastered the screens you can design your own very easily to replace the original 10 using the same line numbers as a computed RESTORE is used to keep the program more compact.

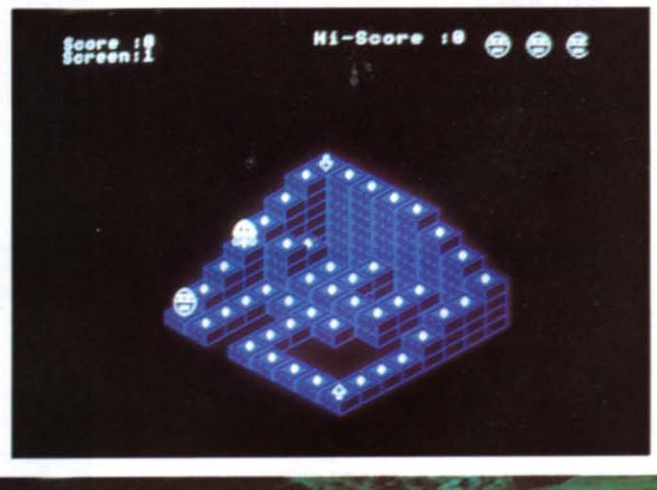
There are eight data items consisting of eight digits which can be from zero – which creates a hole – to a maximum height of nine. The figure shows how the screen layout relates to the data statements. Following these are eight further values which are:

- X and Y coordinates of down transporter.
- X and Y coordinates of up transporter.
- Start X and Y coordinates of octopus.
- Start X and Y coordinates of droid.

The movement of the octopus is in a straight line. It can climb one level until it reaches a barrier, at which point it tries to turn right; then left and if that fails goes back.

A1	A2	A3	A4	A5	A6	A7	A8
B1	B2	B3	B4	B5	B6	B7	B8
C1	C2	C3	C4	C5	C6	C7	C8
D1	D2	D3	D4	D5	D6	D7	D8
E1	E2	E3	E4	E5	E6	E7	E8
F1	F2	F3	F4	F5	F6	F7	F8
G1	G2	G3	G4	G5	G6	G7	G8
H1	H2	H3	H4	H5	H6	H7	H8

Eight data items in each row




```
 10 REM The Crystal Sea
 20 REM By Rob Walmsley
 30 REM (c) The Micro User
 40 PROCrel:PROCenv:MODE7
 50 PROCB:MODE1:VDU23;8202;0;0;0;
 60 VDU19,2,7;0;19,3,7;0;:PROCI
 70 REPEATPROCJ:REPEATTIME=0:PROCS
 80 REPEAT:TIME=0
 90 PROCO:PROCN:IF D%=0 PROCM
100 PROCU:PROCN:REPEATUNTILTIME>=25
110 VDU5:UNTILD%ORB%:*FX21
120 IF B% U%=(U%+1)MOD10 ELSE PROCD
130 REPEAT UNTIL TIME>400
140 UNTILN%=0:PROCE:UNTIL0
150 DEFPROCB
```

Turn to Page 124 ▶

THE PERFECT PAIR

The best-selling, award-winning BBC software is now joined by THE definitive guide

The Program

Mini Office II is the highly-acclaimed suite of integrated programs which turns your computer into a versatile business machine.

It's the perfect package to increase your personal productivity – with more than 400,000 satisfied users across the complete Mini Office range.

The Book

The Dabhand Guide to Mini Office II is a brand new book to help you get the most out of the software. It not only contains the facts, but also the kinds of hints and tips that can only be built up through years of computer use.

More than a manual, the guide assumes nothing. Beginning with the first sentences typed into the editor, you are led through all aspects of using the system, up to the most advanced techniques.

All the examples are also on an accompanying disc which even includes a very useful routine to print out large spreadsheets sideways.

What's more, when you buy Mini Office II and the book together we'll knock £5 off the combined price!

WORD PROCESSOR: Compose a letter, set the printout options using embedded commands or menus and use the mail merge facility to produce personalised circulars.

DATABASE: Build a versatile card index, do powerful multi-field sorting, use the flexible printout routine, perform all arithmetic functions and link with the word processor.

SPREADSHEET: Prepare budgets and tables, total columns and rows with ease, copy formulae absolutely or relatively, and recalculate automatically.

LABEL PRINTER: Design the layout of a label, select any label size and sheet format, read in files from the database module and print out in any quantity.

GRAPHICS: Produce pie charts, overlay line graphs and display bar charts side by side or stacked. Enter data directly or load data from the spreadsheet.

COMMUNICATIONS: Access services such as MicroLink and Telecom Gold, send electronic mail, telex, fax and tele-messages in a flash or order a wide range of goods.

Please turn to the order form on Page 119

B B+

How to get on the ball

Eric Crisp collides with the sticky problem of impacting sprites

HOW did you get on with your homework last month? You mean you didn't do it? Right – everyone gets more homework today. Now pay attention while I show you how to make our little man head the red bouncing ball. First, he must be restricted to the bottom of the screen. Remove lines 340 and 350 in PROCKEYS – which test the up and down keys – to stop vertical movement and change the starting value of *Y%* from Y%=0 to Y%=MINY% on line 17.

The next task is to test for the man and ball colliding. This could be done by checking their relative positions, however I favour the pixel method. We only need to do so where the ball is about to move when it is falling – when *CYB%* is negative – so insert line 607 into PROCBALL and a new procedure, PROCCHECK as follows:

```
607 IF CYB%<0 THEN PROCCHECK
700 DEFPROCCHECK
710 C1%=POINT(XB%+2*WB%,YB%-4*HB%)
730 IF C1%<1 THEN ENDPROC
740 CYB%=-CYB%
750 ENDPROC
```

Line 710 sets *C1%* to the colour of the pixel immediately beneath the current position of the ball. If this is red, yellow or white – colours one, two or three – the vertical direction is reversed – line 740.

The game should stop when the ball reaches the ground. Since line 640 currently tests for the bottom of the screen and makes it bounce it needs changing to:

```
640 IF YB%<MINYB% THEN ENDPROC
```

Change lines 50 and 60 and insert lines 55 and 57 as follows:

```
50 UNTIL YB%<MINYB%
55 PRINT "Hard luck!  Press SPACE for another
 go."
57 REPEAT UNTIL INKEY(-99)
60 CLS:GOTO 15
```

Line 50 exits the main loop when the ball reaches the ground and line 57 waits for the spacebar to be pressed ready for another go.

When the program is run, it is too difficult to play – the man moves horizontally at the same speed as the ball, making it impossible to catch it up. The solution is to speed up the man by moving him twice to every single movement of the ball, using these lines:

```
 40 PROCKEYS
 45 *FX19
 47
PROCMAN(1)
```

Well, that was your homework. No doubt some of you managed it in your own way, but as long as it works, you get full marks. Before we go any further, I must confess something: I upset the editor last month. He didn't like all the MAN files I'd created, as they wouldn't fit on to the catalogue of the monthly disc. The solution he used was simple – combine all the MAN files into one MEN file. You might like to do this yourself, as it loads faster as well as saving catalogue space.

Change line 197 and 198 to the following:

```
197 *SAVE MEN 2800 2980
198 END
```

Now run it and the MEN file is created. Load the animation program again and delete lines 110 to 196 and insert the following

```
110 *LOAD MEN 2800
```

The MAN files are no longer needed unless you ever want to modify them with the sprite definer.

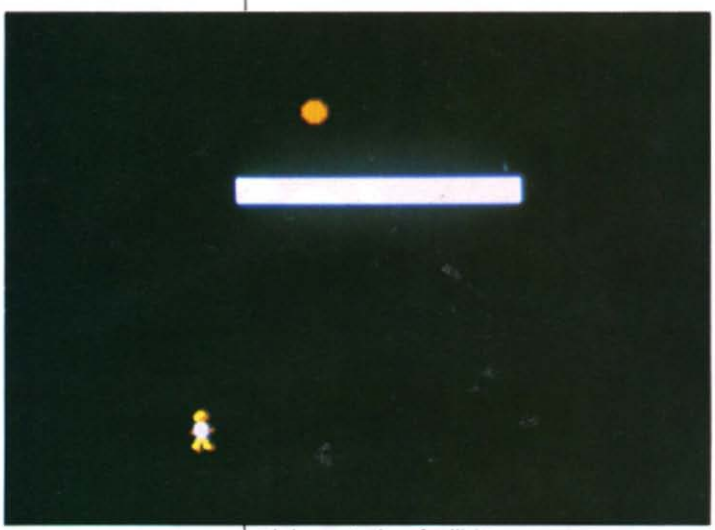
Back to our budding footballer: The homework solution is not perfect. For instance, the man doesn't always head the ball when he should because PROCHEAD looks at just one pixel, and if this misses the man the collision is not detected, even though part of the ball may well have touched him.

To ensure that a collision is detected no matter which part of the ball hits the man, it is necessary to check each pixel where the ball is about to go. In Basic this would involve a great number of POINT commands, which would make the program much too slow.

So here we go again: Time for a little machine code. Don't panic, the collision detection routine is included at the end of this article. And the way to incorporate it with the sprite routines published in the July issue is also described there.

To use the routine, call *BUMPMOVE* instead of *SPRITEMOVE* whenever the ball is moved.

Turn to Page 52 ▶



A demonstration of collision detection using the routines

◀ **From Page 51**

BUMPMOVE moves sprites like *SPRITEMOVE* but also tests each pixel where the sprite is being put. To do this it needs a template image of the area to be tested and whether a particular colour is being looked for.

The template image is created as a shape the same size as the sprite. The easiest way to do so for the ball sprite is to modify the ball shape with the sprite definer like this: Select Mode 1, set width and height to eight, load the BALL sprite as number one and choose the mask option. This changes all black pixels to white and all others to black. Select mask again; the ball shape is then as before, but white. Save this new sprite as MASK.

The template image can be loaded into memory along with the other sprite shapes. Its address in memory needs putting into the double byte location *MASK* each time *BUMPMOVE* is called.

After calling *BUMPMOVE*, the byte *FLAG1* will be zero if the ball moved on to a blank area of screen. If any one of the pixels were coloured, its value will be between 1 and 255.

The byte *FLAG2* is similar to *FLAG1* except that it tests for a particular colour, as indicated by the location *COLOR*. If we wish to look for collisions with red objects – colour one – set ?COLOR=1 before calling *BUMPMOVE*. If ?FLAG2 is zero no red pixels were found, though other colours may have been there.

The collision routine needs one other byte set up, and that is *KILL*. If not zero, the ball is always plotted in its new position. When it is not zero, the ball is removed when a collision is detected. The significance of this should become apparent later.

To incorporate the collision detection routine, change lines 3 and 680 to the following

```
  3 SPRITE=&903:SPRITEMOVE=&900:BUMPMOVE=&90
6
680 IF F%=0 THEN CALL SPRITE ELSE CALL BUMPM
OVE
```

Remove lines 607, 710, 720, 730 and 740 and insert these:

```
  9 FLAG1=&82:FLAG2=&83:COLOR=&84:MASK=&86:K
ILL=&88
 35 PROCCHECK
198 *LOAD MASK 2990
665 !MASK=&2990:?KILL=0:?COLOR=0
720 IF CYB%<0 AND ?FLAG1>0 THEN CYB%=-CYB%
```

Line 720 causes it to be headed when the ball is moving down and a collision with any colour is detected.

This program now ensures that the ball is *headed* whenever it touches the man. The problem now is that the ball covers the man before bouncing away. If line 665 is changed so that ?KILL=1 the ball is rubbed out when ?FLAG1>0. This allows the ball to be placed where it should be after a bounce, using the routine SPRITE. Insert lines 710 and 740 into PROCCHECK as follows after changing line 665 as suggested:

```
710 OLDCYB%=CYB%:OLDCXB%=CXB%
740 IF ?FLAG1>0 THEN XB%=XB%-OLDCXB%:YB%=YB%
-OLDCYB%:PROCBALL(0)
```

This change sets *XB%* and *YB%* back to their previous value and puts the ball back on to the screen.

To make the game a little more interesting put a white platform in the middle of the screen by inserting line 19:

```
 19 GCOL 0,3:MOVE 400,400:MOVE 800,400:PLOT
85,400,432:PLOT 85,800,432
```

Now run the program and you should find a bug – yes, it's deliberate: Whenever the ball goes up under the platform it doesn't bounce but goes through leaving images of itself behind. This is because the bounce is only carried out when the ball moves down.

The solution is to cause a bounce whenever white pixels are detected whether or not the ball is going up or down. To do this, change line 665

Turn to Page 55 ▶

COLLISION DETECTION

This collision routine is designed to be merged into the sprite routines supplied in July's issue. It is best typed in as it stands so that the Get it Right! check can be done before you merge it with the original.

To merge the two programs, first load the collision routine and type:

```
*SPOOL X
LIST
```

This saves the listing under the name X. To close the file when the listing has finished enter:

```
*SPOOL
```

Now load the original sprite program and merge in the collision routine with

```
*EXEC X
```

When this is completed, save your collision and sprite assembler under some suitable name such as COLLIDE. The code still fits within 512 (&200) bytes.

For fast delivery telephone your order on 01-205 9558 using VISA/Access Card

Orders welcome from government depts & educational establishments

TECHNOMATIC

Techno House 468 Church Lane, London NW9 8TQ.
Tel: 01-205 9558 Fax: 01-205 0190

All prices ex VAT
Prices are subject to change without notice
Please add carriage
(a) £8.00 (Courier)
(b) £3.50
(c) £1.50
(d) £1.00

Archimedes Computer Systems

All Archimedes systems are fitted with new RISC OS systems.

Model	Basic	Colour
A3000	£649	£849
310	£899	£1099
410/1	£1199	£1399
420/1	£1699	£1899
440	£1929	£2129
440/1	£2499	£2699
PC Emulator	£60	

Carriage £12/system £8/computer

*For the colour system we offer a choice between Acorn Colour Monitor (Philips CM8533) and Philips CM8833 with RGB/RGBi and Comp Video input and stereo sound facility.

*Every 440 System will be supplied with Acorn Developers Toolbox and a PC Emulator or First Word Plus at no extra cost.

Technomatic Special Deal

To get you going on any of the above Archimedes systems you purchase from us, we will contribute 10% of its cost towards any additional hardware or software purchase you make from us or to pay for extended finance if you require the facility.

The following MultiScan Monitors can be supplied at special prices when purchased with a computer:

TAXAN 770+ **£425(a)** MTS9600 **£375(a)**
CM1686 16" **£1499(a)**
(for the extra HiRes modes on 400 series)

Extended Finance

We can offer extended finance for 11 months under our special offer detailed above or for 24/36 month period at 12.75% (approx APR 26%). Please send for details. Technomatic is a licensed credit broker.

Technomatic is an authorised Archimedes R140 Unix Systems dealer

EXPANSION SYSTEMS

RISCOS (305/310/440)	£29(b)
Fitting	£10
1Mb RAM upgrade (410/420)	£169(c)
3Mb RAM upgrade (410/420)	£499(b)
1Mb RAM upgrade A3000	£199(b)
3.5" Int Drive Upgrade	£118(b)
(please specify 305/310 or 410)	
External Drive Adaptor	£30(c)
External 5.25" Drive with psu (40/80T)	£90(b)
Acorn 20 Mb Upgrade (305/310)	£449(a)
Techno 20Mb upgrade kit (410)	£199(a)
Techno 40Mb upgrade kit (410)	£349(a)
Techno Ext HD upgrade	POA
Acorn Backplane (2 slots)	£37(c)
TechnoLog Backplane (4 slots)	£39(c)
Fan for TechnoLog	£8(d)
Acorn ROM podule	£51(c)

We have a large range of expansion cards in stock please send for details.

MULTI I/O Podule

A low cost card provides: **Video Digitiser, Sound Sampler**, a full RS232 interface, 3 ROM skts & Joystick interface. **£107(b)**

Archimedes, SOFTWARE

LANGUAGES & PROG. TOOLS

ANSI C/ISO PASCAL/ FORTRAN 77	each £95(c)
PROLOG X/LISP	each £175(b)
TWIN Editor	£27(d)
Archimedes Assembler	£185(b)
Software Dev. Toolbox	£185(b)
RISC BASIC Compiler (SV)	£85(c)
Chares Toolkit **£32(d)** Clares Toolkit+	£41(d)

WORD PROCESSORS

First Word Plus	£79(c)
Graphics Writer	£27(d)
Pipedream	£89(c)
Pipedream Spellchecker	£43(d)

SPREADSHEETS

Logistix **£95(c)** Sigmasheet **£57(c)**

ACCOUNT SYSTEM

Minerva's Suite* each £54(d)
(Order Processing/Sales Ledger/Stock Manager/ Purch. Ledger/Nom. Ledger)
**Requires System Delta plus*
Home Accounts **£41(d)**

EMULATED PACKAGES

VIEW/Viewsheet/Viewstore	each £47(d)
Interword/Intersheet	each £35(d)
Wordwise	£20(d)

GRAPHICS/ART/CAD

Pro Artisan **£137(b)** Artisan **£30(d)**

Artisan Support Disc	£17(d)
Atelier	£99(c)
Auto Sketch	£69(d)
Gamma Plot	£57(d)
Render Bender	£65(d)

Presenter **£24(d)** SVARC-PCB **£167(b)**
SV Solid CAD **£41(d)** SV Super Dump **£20(d)**
Sv Real Time Solids Modeller **£75(c)**

GAMES

Hoverbod/Missile Control	each £12(d)
Orion/Freddie's Folly/Jet Fighter	each £12(d)
Fugitive Quest/Rise in Crime/Overload	each £26(d)

Zarch **£15(d)** Conqueror **£24(d)**
Enthar Seven **£29(d)** Minotaur **£9(d)**
Clares 3 Games Pack **£12(d)**
Thundermonk **£12(d)** Corruption **£20(d)**
Pacmaria **£16(d)** Terramex **£16(d)**

DATABASES

System Delta Plus	£57(c)
System Delta Plus Prog Ref Manual	£25(d)
Reporter*/Mailshot*	each £33(d)
School Administrator	£125(b)
Alphabase	£37(d)

**Requires System Delta plus*

MISCELLANEOUS

PC Emulator	£79(d)
HEARSAY Comms Package	£55(d)
MAYA Terminal Emulator	£49(d)
Control (setup utility)	£13(d)

Ex-SERVICE EQUIPMENT

Our Service department has a number of disc drives, monitors and printers available for sale at reduced prices. Please send for detailed list.

MASTER SERIES

AMB15 Master 128 **£439(a)**

The Master package includes: ***View Word processor and Viewsheet spreadsheet software and EITHER Educational/Fun software bundle with STARdataBASE package OR A 200K 40T DS single drive TS200. Please specify your choice.***

ADC06 Turbo 65C102 Module **£115(b)**

Technomatic is a Acorn Authorised Econet Referral Centre. We carry a full range of Econet Accessories in stock.

DISC DRIVES

400K/640K per mechanism (all drives)
5.25" Double sided (40/80T Sw):

TS400 Single	£80(b)
PS400 Single with psu	£90(b)
TD800 Dual	£160(a)
PD800 Dual with psu	£170(a)
PD800P Dual with psu plinth mounted	£185(a)
3.5" Double Sided	
TS351 (5.25")	£69(b)
PS351 (5.25" Case + psu)	£95(b)
TD352 Dual	£126(a)
PD352 Dual with psu	£139(a)
Combo Drives 5.25" + 3.5" & psu	
PD853	£170(a)
PD853P plinth mounted	£190(a)

WINCHESTER DRIVES

P30HD 30Mb Hard Drives **£410(a)**
Other sizes available

PRINTERS

EPSON

LX800 **£145)a)** LQ500 **£245(a)**
FX850 **£285(a)** LQ850 **£405(a)**

STAR

LC10 **£149(a)** LC10 Colour **£199(a)**
LC24-10 **£269(a)**

NATIONAL PANASONIC

KXP1081 incl master lead	£139(a)
KXP1124	£269(a)
Integrex Inkjet Colour	£515(a)
Hitachi 672XD A3 Plotter	£479(a)

This advertisement can only show an example of the range of products stocked by Tchnomatic. So send for our latest BBC catalogue providing detailed information and prices on BBC Computer Systems, Peripherals, Software and Books. To obtain your free copy please complete and return the coupon below.

Technomatic is an authorised BBC Computer and Econet Referral Centre providing a professional and reliable service to the BBC user.

NAME .....

ADDRESS .....

.....

..... Post Code .....

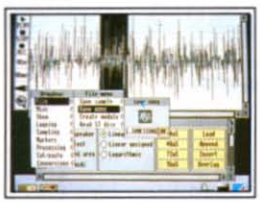
8/89

Return to Technomatic Ltd, Techno House, 468 Church Lane, London NW9 8TQ.

CLARES

THE *biggest* BREAK *for* EARS *in* YEARS

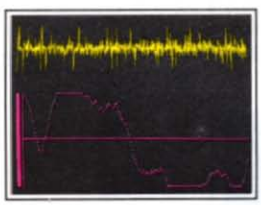
Here's a chance to let the composer in you break out and go wild. Introducing *Armadeus*, an incredible new sound sampling package from Clares.



What is sound sampling? Sound sampling is the ability to take a basic sound or musical piece and then bend it, shape it, move it, repeat it, create something new and exciting from it. The sound can then be transferred to your cassette player or added to computer programs as a sound track. (*Armadeus* is totally RISC OS compatible.)

How does it work? A sound sampling package consists of two main components. Hardware and software. The hardware is on a board, which can fit into an Archimedes backplane. There we fit external devices like a microphone, hi-fi or a CD player which allows input. The sound is then simply imported into the computer, and that's all there is to it.

What is sound sampling useful for? There are many varied uses. Sound sampling is professionally used in recording studios. Analysing musical characters and pieces, allowing various parts to be recognised and changed. And more commonly, it's used for fun, creating wild and whacky noises, or sound tracks for home videos and computer programs.



Armadeus from Clares. It's the biggest break for ears in years.

£79.95

Armadeus

The Sensational Sound Package

Total control is now available with *Armadeus Sampler Board*, the perfect Hardware end for your sound sampler system.

£149.95

CLARES
MICRO SUPPLIES

98 Middlewich Road, Rudheath, Northwich, CHESHIRE CW9 7DA.
Telephone: 0606 48511 Fax No: 0606 48512

◀ *From Page 52*

so that ?COLOR=3 and then insert line 730 into PROCCHECK like this:

```
730 IF ?FLAG2>0 THEN CYB%=-OLDCYB%:CXB%=OLDC
XB%
```

Another dimension can be added to the game by making the ball move as it would under gravity. This is done by changing *CYB%* by one each time the ball is moved. It also has to be initialised to zero, so change line 17 so that CYB%=0 and insert:

```
615 CYB%=CYB%-1
```

There is no reason why the ball shouldn't have a random bounce whenever the man heads it. Change line 720 to:

```
720 IF CYB%<0 AND ?FLAG1>0 THEN CYB%=RND(40)
:IF RND(2)=2 THEN CXB%=-CXB%
```

This change makes the ball bounce higher or lower and to the left or right at random.

The final change is to make the man jump using the spacebar. While in the air the left, right and jump keys will have no effect until gravity pulls him down again. The variable *JUMP%* will be zero when the man is on the ground and one when he is in the air. So add JUMP%=0 to the end of line 17.

Insert line 340 to detect the spacebar and set up *CY%* and *JUMP%* when it is pressed:

```
340 IF INKEY(-99) THEN CY%=24:JUMP%=1
```

Also insert line 305 to allow gravity to pull the man down instead of testing for key presses:

```
305 IF JUMP%=1 THEN
CY%=CY%-2:ENDPROC
```

Add JUMP%=0 to the end of line 78 to indicate that the man is on the ground again.

Well, that's it for this month, but for those who want extra homework try putting a white obstacle on the ground that the ball can bounce off but the man has to jump over.

● *Next month features a true machine code sprite routine – as opposed to the exclusive-ored one we've been using.*

```
  105 FLAG1=&82:FLAG2=&83:COLOR=&84:TEMP
=&85:MASK=&86:KILL=&88
  135 SMODE3=SMODE1+SMODE2
  191 JMP SPRITE0
  192 .BUMPMOVE
  193 JMP COLLIDE
  194 .SPRITE0
  195 JSR CONVERT
  196 JSR COPYOLD
  197 JSR SPLOT
  198 JMP COPYOLD
  199 .CONVERT
  600 RTS
  610 NOP
 1362 ]
 1365 PROCEXTRA
 1367 [
 1368 OPTI%
 1430 *SAVE SPRTcod 0900 0AB8
 2000 DEFPROCEXTRA
 2010 [
 2020 OPTI%
 2030 .COLLIDE
 2040 JSR SPLOT
 2050 JSR CONVERT
 2060 JSR COPYOLD
 2070 LDA #0
 2080 STA FLAG1
 2090 STA FLAG2
 2100 ]
 2110 IF SMODE3=3 THEN PROC4COL
 2120 IF SMODE3=2 THEN PROC16COL
 2130 [
 2140 OPTI%
 2150 LDY SCRNOLD+1
 2160 LDA SCRNOLD
 2170 .COLLIDE1
 2180 STY ZSCRN+1
 2190 LDX HIGHOLD
 2200 STA ZSCRN
 2210 .COLLIDE2
 2220 LDY #0
 2230 LDA (ZSCRN),Y
 2240 AND (MASK),Y
 2250 BEQ COLLIDEX
 2260 STA FLAG1
 2270 STA TEMP
 2280 ]
 2290 IF SMODE3=3 THEN PROC4COLTEST
 2300 IF SMODE3=2 THEN PROC16COLTEST
 2310 [
 2320 OPTI%
 2330 STA FLAG2
 2335 .COLLIDEX
 2340 INC MASK
 2350 BEQ COLLIDE0
 2360 .COLLIDE3
 2370 INC ZSCRN
 2380 LDA ZSCRN
 2390 AND #7
 2400 BEQ COLLIDE7
 2410 .COLLIDE4
 2420 DEX
 2430 BNE COLLIDE2
 2440 LDY SCRNOLD+1
 2450 LDA SCRNOLD
 2460 CLC
 2470 ADC #8
 2480 STA SCRNOLD
 2490 BCS COLLIDE6
 2500 .COLLIDE5 DEC WIDEOLD
 2510 BNE COLLIDE1
 2520 JSR COPYOLD
 2522 LDA KILL
 2524 BNE KILLEND
 2526 .CARRYON
 2530 JSR SPLOT
 2540 JMP COPYOLD
 2542 .KILLEND
 2544 LDA FLAG1
 2546 BEQ CARRYON
 2548 RTS
 2550 .COLLIDE6 INY
 2560 STY SCRNOLD+1
 2570 BNE COLLIDE5
 2580 .COLLIDE7
 2590 LDA ZSCRN
 2600 BEQ COLLIDE9
 2610 .COLLIDE8
 2620 CLC
 2630 ADC #(LINSTEP-8) MOD 256
 2640 STA ZSCRN
 2650 LDA ZSCRN+1
 2660 ADC #(LINSTEP-8) DIV 256
 2670 STA ZSCRN+1
 2680 BNE COLLIDE4
 2690 .COLLIDE9
 2700 INC ZSCRN+1
 2710 BNE COLLIDE8
 2720 .COLLIDE0
 2730 INC SDATOLD+1
 2740 BNE COLLIDE3
 2750 .COLTABLE
 2760 ]
 2770 RESTORE 2900
 2780 FOR J%=1 TO 8
 2790 READ A%
 2800 ?P%=A%:P%=P%+1
 2810 ?P%=A%+1:P%=P%+1
 2820 NEXT
 2830 ENDPROC
 2900 DATA 0,4,16,20,64,68,80,84
 3000 DEFPROC4COL
 3010 [
 3020 OPTI%
 3030 LDA COLOR
 3040 AND #3
 3050 CMP #2
 3060 BCC COL4
 3070 ADC #13
 3080 .COL4
 3090 STA COLOR
 3100 ]
 3110 ENDPROC
 3500 DEFPROC16COL
 3510 [
 3520 OPTI%
 3530 LDA COLOR
 3540 AND #15
 3550 TAY
 3560 LDA COLTABLE,Y
 3570 STA COLOR
 3580 ]
 3590 ENDPROC
 4000 DEFPROC4COLTEST
```

Turn to Page 56 ▶

GRAPHICS

Get it right!

◀ From Page 55

```
4010 [
4020 OPTI%
4030 LDY #4
4040 .COL4TEST
4050 AND #17
4060 CMP COLOR
4070 BEQ COL4TEST1
4080 LDA TEMP
4090 LSR A
4100 STA TEMP
4110 DEY
4120 BNE COL4TEST
4130 LDA FLAG2
4140 .COL4TEST1
4150 ]
4160 ENDPROC
4500 DEFPROC16COLTEST
4510 [
4520 OPTI%
4530 AND #&55
4540 CMP COLOR
4550 BEQ COL16TEST1
4560 LDA TEMP
4570 LSR A
4580 AND #&55
4590 CMP COLOR
4600 BEQ COL16TEST1
4610 LDA FLAG2
4620 .COL16TEST1
4630 ]
4640 ENDPROC
```

```
 105 = A8F6 6
 135 = 6A29 7
 191 =  339 2
 192 = D552 6
 193 = 8043 A
 194 = 2DC6 0
 195 =  26D D
 196 = E8FD C
 197 = EDB8 2
 198 = 83F8 4
 199 = 4797 0
 600 = 9843 8
 610 = 41AB 0
1362 = 8B58 5
1365 = 6A0D 8
1367 = EB9E 8
1368 = 4037 3
1430 = 7BA4 5
2000 = C169 9
2010 = EB9E 3
2020 = 4037 2
2030 = AEBC 5
2040 = EDB8 7
2050 =  26D 1
2060 = E8FD 7
2070 =  295 5
2080 = D018 6
2090 = E07B 2
2100 = 8B58 C
2110 = E788 B
2120 = 1E91 E
2130 = EB9E D
2140 = 4037 0
2150 = C1AC 7
2160 = DD4E 1
2170 = CE56 E
2180 = ADBE 9
2190 = B6AE 9
2200 = 8DBE 1
2210 = FE35 B
2220 = 9CF1 D
2230 = 6EAB 5
2240 = 254F E
2250 = DF16 6
2260 = D018 0
2270 = 67B6 1
2280 = 8B58 D
2290 = 4F36 3
2300 = FEFE C
2310 = EB9E B
2320 = 4037 A
2330 = E07B 9
2335 = 33D9 8
2340 = 333D F
2350 = 32B8 2
2360 = EE14 1
2370 = FDF3 B
2380 = 7BA0 C
2390 = 4EFF 6
2400 = 425F 2
2410 = 9EF3 9
2420 = E8A9 5
2430 = F12D F
2440 = C1AC A
2450 = DD4E 4
2460 = 74FB A
2470 = 20B6 0
2480 = 97D6 3
2490 = 7D00 7
2500 = AA80 A
2510 = C14E 2
2520 = E8FD E
2522 = EE1F F
2524 = 23F7 8
2526 = 72E2 C
2530 = EDB8 0
2540 = 83F8 A
2542 = 3A7B 3
2544 = 2606 4
2546 = 5FFB B
2548 = 9843 5
2550 = CB29 8
2560 = 211A F
2570 = 81CA 2
2580 = AE90 8
2590 = 7BA0 E
2600 = A391 4
2610 = 5F7F 0
2620 = 74FB 2
2630 = 1E5B 0
2640 = 8DBE 0
2650 = 9D27 3
2660 = 5AD8 3
2670 = D7BF 0
2680 = 91EB C
2690 = 4F5E C
2700 = 468F 8
2710 = 5067 3
2720 = DE77 4
2730 = 7F47 9
2740 = E10C 8
2750 = 7BC9 5
2760 = 8B58 C
2770 = 4F4E 4
2780 = DF30 D
2790 = C86D 4
2800 = 7751 8
2810 = B1E4 0
2820 = 2C83 9
2830 = ED0F 2
2900 = 1BF8 2
3000 = A77D D
3010 = EB9E 7
3020 = 4037 5
3030 =  9B0 B
3040 =  E7B 5
3050 = 22BB 4
3060 = 2AF6 3
3070 = 2ECA 8
3080 = 3DB6 0
3090 = FFAE 9
3100 = 8B58 A
3110 = ED0F 6
3500 = CC10 8
3510 = EB9E B
3520 = 4037 2
3530 =  9B0 A
3540 = 9A5A D
3550 = 772F 8
3560 = FBD2 D
3570 = FFAE 6
3580 = 8B58 1
3590 = ED0F 5
4000 = 2908 D
4010 = EB9E B
4020 = 4037 B
4030 = DC75 7
4040 = 513A 1
4050 = BA18 5
4060 = 47F7 E
4070 = A504 1
4080 = B4BB 2
4090 = 1A09 E
4100 = 67B6 9
4110 = F888 0
4120 = 5E22 8
4130 = 1665 4
4140 = 56A6 C
4150 = 8B58 2
4160 = ED0F E
4500 = B7FF 3
4510 = EB9E 2
4520 = 4037 5
4530 = D8F6 D
4540 = 47F7 0
4550 = 89B8 2
4560 = B4BB 3
4570 = 1A09 8
4580 = D8F6 D
4590 = 47F7 C
4600 = 89B8 E
4610 = 1665 7
4620 = F4C4 7
4630 = 8B58 7
4640 = ED0F 8
```

PINEAPPLE SOFTWARE

PCB DESIGNER

PCB is a powerful Rom based printed circuit board design program suitable for all BBC computers. Its fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second eprom is optionally available to add a powerful auto-track routing facility to the program. This utilises a 'rats-nest' input routine and allows any component to be 'picked up' and moved around the board without having to respecify component interconnections. The full auto-route facilities are available even on a standard unexpanded model 'B'.

'PCB auto-route is remarkable. No similar software comes near the price.'–ACORN USER, Aug. '88.

'Although it appears expensive, there is nothing else remotely similar, even on other micros for less.'–BEEBUG, April '88.

PCB Manual Track Routing £85.00
PCB Auto-routing £185.00
PCB Plotter Driver £35.00
P&P Free

IBM PCB DESIGNERS

EASY-PC EASY-PC is a powerful PCB design program combined with a schematic drawing package. Up to 8 board layers plus upper and lower silk screens. Board size up to 17"x17". Powerful zoom and pan features. Suitable for IBM PC/XT/AT & compatibles with 512k Ram.

EASY-PC £270.00
P&P Free

PCB TURBO V2 Unbeatable full feature auto-routing IBM PCB designer. Boards up to 32" x 32" with 6 layers. Output to pen plotter, photoplotter, dot-matrix printer or laser printer. Minimum requirements: IBM XT/AT compatible (286 or 386 processor) with 640k Ram and 10mb hard disc. CGA, EGA or VGA colour graphics adapter.

PCB TURBO V2 ..... £695.00
P&P Free

ROLAND PLOTTERS

New 1000 series plotters at unbeatable prices! All with A3 paper handling 8 pens and 420mm/sec plotting speed. Parallel and serial interfaces and soft pen landing with automatic origin setting on all models. 1200 model has addition of electrostatic paper hold and X-Y coordinate display. 1300 model also has manual pen speed adjustment and a 1Mb buffer.

DXY 880A £540.00
DXY 1100 ..... £625.00
DXY 1200 ..... £865.00
DXY 1300 ..... £1025.00
P&P £10.00

Please add 15% VAT to all prices

HOME ACCOUNTS

A brand new program from Pineapple offering the simplest solution to keeping track of all your home accounts. The program is unbelievably simple to use but still offers all the essential features such as automatic standing order handling, statement reconciliation etc. Any number of accounts may be stored on disc and transfers between accounts requires only a single operation. Available for Model 'B', Master and Compact with disc drive.

Home Accounts ..... £19.95 P&P Free

DIAGRAM II

Still the only BBC drawing package to allow really large diagrams (up to 30 mode 0 screens DFS, 80 mode 0 screens ADFS) to be created. The unique scrolling and indexing system allows easy access to any part of the diagram, and the rapid line drawing routines enable diagrams to be produced very rapidly. The print routines provide unequalled flexibility with infinitely variable H & V scales and 90 deg. rotation if required. The smallest scale allows up to 18 mode 0 screens to be printed on an A4 sheet with clearly readable text, and full use can be made of wide carriage printers.

'The quality of printing is the last factor which makes Diagram II so outstanding. The package really is capable of producing top quality diagrams.'–ETI, March '88

Diagram II ..... £55.00 P&P Free

ADFS Utilities Rom

ADU is an invaluable utility for all ADFS users. It adds over 22 new *commands to the ADFS filing system as well as providing an extensive Menu facility with over 35 sub commands covering areas such as repeated disc compaction, saving and loading Rom images, auto booting of files and many more. Transferring of files from DFS to ADFS is also made very easy with *DFSADFS.

ADU ..... £29.00 P&P Free

MARCONI TRACKERBALLS

We now have an adapter available to link the trackerball to the Archimedes, to enable it to directly replace the Archimedes mouse.

Bare Trackerball (no software) £45.00
For Master 128 (with Pointer Rom) £59.00
Adapters to drive BBC Mouse software £8.00
For Model 'B' and 'B+' (with Icon Artmaster) £59.00
Pointer Rom for Master 128 ..... £12.50
Archimedes Adapter £19.95
Trackerballs also available for other computers, please 'phone for details P&P on Trackerballs £1.75

MITEYSPICE, SPICE.AGE and ECA-2

Three very powerful circuit analysis packages. Miteyspice is available for the BBC range of computers, and Spice.Age and ECA-2 for the IBM and compatibles. Spice.Age is a new product for the IBM range which provides facilities for transient and Fourier analysis as well as D.C. and Freq. response performance.

Miteyspice (for BBC and Archimedes) £119.00
ECA-2 (IBM PC/XT/AT 256k Ram) £675.00
Spice.Age (IBM PC/XT/AT 512k Ram) ..... from £70.00
LCA-1 (Logic Analyser for IBM's) £350.00
P&P Free

VISA

Please address all enquiries to:
PINEAPPLE SOFTWARE
Dept. MU, 39 Brownlee Gardens, Seven Kings, Ilford, Essex IG3 9NL. Tel: 01-599 1476

Access

Your technical questions answered by MIKE COOK

PROBLEM SOLVED

Tying up loose ends

I OWN a BBC B Issue 4 with single disc drive, View and 1.20 DNFS. I bought it second-hand about three years ago and after a year I began experiencing trouble. Occasionally a line was left between each prompt and any disc access or program was interrupted. At first I thought spurious Returns were causing the problem, but I now believe this was not the case.

The micro appeared to be jumping to the Escape routine as with osbyte 125 and also hung up regularly. The problem was solved by apparently doing nothing more than reinserting the Basic chip and waggling the S32 and S33 links above it.

In recent months the fault slowly crept back: It began very occasionally, becoming more frequent, until now I only occasionally get 10 minutes' sense out of the machine. I have tried wiping the legs of the Basic chip and the pins of the two links, and checking the connections are firm, but to no avail. Have you any idea what could be wrong, and if so what can I do about it? – **Clint Redwood, Stockport, Cheshire.**

● *Your micro is suffering from the disease known as* loosious connectious. *What is wrong is that an IC socket is making an intermittent connection.*

The cure of removing a chip and reinserting it is, as you have found, normally only temporary. You need to isolate the faulty socket and replace it. This is easier said than done, as it is likely that the Basic chip socket is not the faulty one. It is just that the flexing and strain the PCB is subject to when removing it makes the connection again.

If you know the history of the machine think what upgrades have been fitted. They can cause trouble if they are the type that plug into an IC socket, because when you remove them the socket no longer has the same amount of springiness.

This happened on my own micro – as you might guess in my position of reviewer I have had many upgrades installed and removed. My problem seemed to be solved by pressing on the rom chips.

However, replacing all the rom sockets did not cure it so I waited until the micro crashed and tested the data and address buses on various IC pins with an oscilloscope. Care was needed, as a small amount of pressure on the pins could have remade the connection.

Eventually, I found one address line whose signal was on the microprocessor but not on any of the roms. This pointed to the microprocessor socket, and I've had no problems since it was replaced

Summer snow

I GET snow on my BBC Micro in some modes. It is only just visible when I switch on, but increases gradually and often after about 15 minutes the words are unreadable. This is a particular nuisance when I want to preview in Wordwise.

It still occurs when I disconnect all peripherals and extra roms. There are no other electric appliances nearby. Can you please suggest what might be wrong? – **G. Battershall, Upper Colwyn Bay, Clwyd.**

● *It sounds very much as though the video ULA chip needs replacing. As Mode 7 does not use this the absence of snow in that mode would clinch the diagnosis.*

No joystick

RECENTLY my trusty Harrier joystick broke and since then I have been looking for an interface so I can use an Atari-type one. Local computer shops have said that they are very hard to come by and I am desperately looking for somewhere to get one.

Could you supply me with the name and address of a dealer who produces a joystick interface for the BBC Micro? – **Simon Pang, London.**

● *The Atari type joystick uses a common earth switched on to one of four contacts. As such it can't be directly connected to the BBC Micro,*

Turn to Page 58 ►

On the agenda...

- ***Occasional blank lines***
- ***Snow in some modes***
- ***Connecting Atari joysticks***
- ***Not the right port bits***
- ***Keeping the micro cool***
- ***Repairing broken legs***

◀ *From Page 57*

even if you do fit the correct type of plug.

You need an interface such as the one I described in the Body Building article in the February 1985 issue of The Micro User. *This was for a track ball, but it is easily modified for a joystick by putting 3k pull-up resistors on each input.*

This is still available as Body Building Pack 20 and costs £10 for the kit or £12 assembled from Musbury Consultants – see any Body Building article for the address. The pull-up resistors will be fitted to assembled versions free on request.

Railway halted

I OWN a very old BBC Micro which has developed a fault with the user port that I use to help run my model railway. I checked the port's input using a simple program and instead of the result being binary 0000010 it was 11111011 – the exact opposite. It also means my AMX mouse doesn't work correctly.

To keep my railway running I've put a software patch in, for example:

```
W%=?&FE60:W%=NOTW%+256
```

Could you tell me what is causing it? – **P. Connell, Nord Rhein Westfalen, West Germany.**

● *This is one of the strangest and perhaps most puzzling problems I have yet come across. It appears that a system which was working has suddenly started to behave strangely. As it worked before, the fault must lie in your hardware and not your software. However, I think I can work out what might have gone wrong.*

I once had a student who experienced a strange inversion on the outputs of a VIA. It turned out that he was addressing the data direction register and not the data register. What was happening was that when he was writing zero to the output the VIA lines were being programmed to be inputs and so were floating high, thus looking like a logic 1 when he tested the output.

Although your problem is with inputs, I think there might be a similar explanation. As you have had the system working, I think the most likely cause is that address line A1 on the VIA chip is not being properly decoded. This could be due to either a faulty VIA or socket not making a proper connection on that pin.

> *'It's strange that people get paranoid at having five volts exposed in a micro, yet think nothing of letting a child play with the exposed 12 volts that runs the typical electric train set'*

Hot stuff Master

I HAVE added the turbo co-processor inside my BBC Master but after a few hours of use the micro overheats. When one of the 40 column modes – except Mode 7 – is selected the screen flickers, that is small flecks appear and disappear randomly on the screen, not unreminiscent of the snow effect of a weak television signal. After a short while the micro crashes. Rebooting brings it back to life, but only for a few seconds.

Initially, I moved the second processor to a Watford Co-proadaptor, but buying a 512k unit forced me to put it back inside the casing and the problem returned. I have tried swapping the two co-processors over, but the result is the same.

At present I have had to resort to the extreme solution of cutting a hole in the top of the Master's casing.

This is not entirely successful. If I cover the hole with gauze the problem recurs, if I leave it open it does not. However, I do not like the idea of a live power supply, or indeed the interior of the computer, being open to the atmosphere.

If I knew which chip was causing the problem I could either replace it or alternatively, space permitting, put a heatsink on it. Any ideas you have would be greatly appreciated. – **K. V. Kirk, Reading, Berkshire.**

● *Flickering characters in all but Mode 7 points to the video ULA. This chip and the resistor close to it are the hottest parts of the micro. What is happening is that the fitted boards are reducing the cooling convection currents. In the August issue I described how to fit a fan and I think this will cure your problem.*

Incidently, I don't feel that there's anything wrong with leaving the lid off a BBC Micro. It's strange that people get paranoid at having five volts exposed in a micro, yet think nothing of letting a child play with the exposed 12 volts that runs the typical electric train set. All the mains side is enclosed in a metal box and the only danger that could occur is if a child started putting metal objects into the slots.

They shot horses

I HAVE recently added a rom expansion board to my BBC Micro and as a result have had to shift the roms around a bit to gain the necessary order of priority.

However, on replacing the cover I found that my Super-Art rom was in one of the lower priority sockets. I removed the rom, but in doing so broke one of the chip's legs.

As the guarantee typically ran out a couple of weeks ago could you please tell me whether my rom is repairable or will I have to buy another. – **R. T. Jee, Manchester.**

● *Roms are very much like horses. When it comes to broken legs they are better shot. Having said that, many roms can suffer having pin 1 broken, as it is normally not used.*

It is possible to make a repair but it requires the correct tools and some manual dexterity. Break up an old IC socket and extract a pin. Push the IC into another socket and put the pin in the space. Now solder a wire between the top of the pin and the shoulder of the IC. You will need a very fine wire and a small, but powerful, soldering iron, preferably of the temperature-controlled type.

If you don't fancy this approach write to the software publishers. Many software houses will replace a damaged rom at nominal cost if you send in the original. Write and ask them first.

B&S COMPUTING (Nottm) Ltd

258 Derby Road, Bramcote, Nottingham NG9 3JN
Telephone: (0602) 491202 Fax: (0602) 491322

ACORN APPROVED DEALER ***** CITIZEN SUPER DEALER ***** STAR REGISTERED DEALER

ARCHIMEDES COMPUTERS
(carriage free)

	Base	Mono	Colour	Multi-Sync
A3000	£649	£709	£849	£1069
A310	£899	£959	£1099	£1319
410/1	£1199	£1259	£1399	£1619
420/1	£1699	£1759	£1899	£2119
440/1	£2499	£2559	£2699	£2919

PC Emulator (with system) £60
A3000 Monitor Plinth (with system) ..£29

ARCHIMEDES EXPANSION
(carriage £2.50)

1Mb RAM Upgrade* £199
* 400/1 series or A3000 – Please specify machine
(carriage £6.00)
2nd 3.5" Drive (305 & 310) £115
2nd 3.5" Drive (400/1 series) £125
Computerware 20Mb Hard Disc drive (305/310) with backplane £370

ARCHIMEDES SOFTWARE
(carriage £1.50)

1st Word Plus £69
System Delta Plus, Sigma Sheet and Gamma Plot .....each £60
Render Bender £65
Artisan £31
ANSI C, ISO Pascal, Fortran 77 and Logistix .....each £95
(carriage £2.50)
Lisp, Assembler, Prolog X .....each £180
Acorn Desk Top Publisher.....£149
Pro-Artisan £140

WE ARE ABLE TO OFFER A CHOICE OF SPECIAL PACKAGES ON ALL ARCHIMEDES SYSTEMS. 0% FINANCE-CREDIT TERMS – FREE PRINTERS – SOFTWARE ETC

PHONE OR COMPLETE THE COUPON FOR FURTHER DETAILS (B&S are licenced credit brokers)

BBC MASTER 128
(carriage £6.00)

MASTER 128.....£395
The Master 128 comes complete with VIEW 3 word processor and VIEW-SHEET spreadsheet program.

Master 65C102 Co-Processor £115

Take advantage of our system prices which enable you to obtain a complete system at a reduced price.

Second user model B/B+/Master and peripherals often available. Please phone for current price and availability.

PRINTERS
(carriage £6.00)

Citizen 120D £124
Citizen Swift 24 .....£269
Star LC10 (limited offer) £139
Star LC10 Colour (limited offer).....£179
Star LC24-10.....£289

The new Star range of printers is now available. These are "professional" printers with superb performance. 48 pin emulation on the XB range.

Star FR10 .....£339
Star FR15 .....£439
Star XB24-10 .....£439
Star XB24-15 .....£579
Star FR/XB Colour upgrade £39
Star Laser 8 laser printer £1395

One years on site maintenance included on the FR, XB and LASER

Free printer lead and paper with all printers purchased (please state machine)
UK CUSTOMERS: Please add 15% VAT to all prices (INCLUDING CARRIAGE)

Government departments and educational establishments official orders welcomed

All prices are correct at time of going to press and can be subject to change without notification. All goods subject to availability. Finance subject to status.

MONITORS
(carriage £6.00)

Philips CM8833 (Colour) £199
Taxan 770+ (Multi Sync).....£490
Philips BM7502 (Green mono) £64

DISC DRIVES double sided 40/80T
(carriage £6.00)

Without Power supply
Single drive 5.25" £90
Dual drive 5.25".....£180
With Power supply
Single Drive 5.25" £105
Dual Drive 5.25" £195
Dual Drive in plinth 5.25" £199
(carriage £1.50)
Acorn 1772 DFS kit (for BBC B) £47

DISCS AND DISC BOXES
(carriage £1.50)

B&S 5.25" 96tpi Double Sided £10
B&S 3.5" 135tpi Double Sided £13
(The above supplied in library case)
3M 745-0 48tpi Double sided.....£9
3M 747-0 96tpi Double sided.....£13
50 disc lockable box £7
100 disc lockable box £9

THIS ADVERT ONLY SHOWS A PART OF OUR EXTENSIVE RANGE. TO RECEIVE OUR CURRENT CATALOGUE OR DETAILS OF FINANCE, PACKAGES, ETC. PLEASE RETURN THIS COUPON.

Name.....
Address.....
.....
.....
.....
.....

Catalogue ☐ Finance ☐
Archimedes ☐ Master ☐

B B+ M

Road to happy adventuring

The Mad Hatter explores more games – and explains why he does it

SINCE this column contains solutions to parts of three different adventures, it might be worth reminding old hands and new readers alike what my philosophy is regarding solutions. It is, of course, a no-win situation, with letters from readers varying from: *"Please may I have the full solution to ..."* to *"How dare you ruin the brilliant adventure which has had me stuck – but unfrustrated – for the last six months"*.

Now, on principle, I don't issue full solutions as the whole point of games – especially adventures – is to keep us cogitating away, trying to get into the author's mind.

At the same time, we all have our blind spots, and there comes a point where frustration gives way to apathy. When this occurs, we usually turn to another game or even take up another pastime. It's these people I particularly want to help, having a great deal of sympathy for them.

Often, it just needs a gentle shove in the right direction and off we go happy and content instead of being utterly frustrated. People like this rarely pursue the solution given after that – it's there as a kind of back-up because they don't relish the idea of cheating any more than I do.

The final point is this: Quite often I am entrusted with a full solution when the game is issued, but that is for one purpose only – to allow me to make an informed assessment of the game for review purposes. But I won't then serialise a solution to the adventure without permission and certainly not until it has been around for a couple of years or so.

The vast majority of the solutions featured in this column are my own work or that of readers who have kindly sent their answers so they can be made available to a wider audience.

What I will always do is to ensure that there is sufficient tutorial matter in each solution to make it worthwhile reading for people who don't have the game themselves. The whole purpose of this column is to make a fascinating pastime available to more and more people.

Until next month, happy adventuring.

Lording it in time

IN the Age of the Dinosaurs – the third zone in **Lords of Time** – you don't need any special equipment other than the firefly and the rucksack which you should be wearing. If you proceed east from your emergence point you soon get to the watering hole and attract the interest of a tyrannosaurus rex. Move back west, with the monster in pursuit, until you come to the prairie and the allosaurus, which will then engage the attentions of the ravening beastie.

Continuing west, you fall into a pit – a trap, really – where you'll find some leaves and a mirror. A curious brontosaurus peers shortsightedly at you, so if you WAVE the leaves, he'll help you out. Next, wave the mirror: This will have the effect of drawing the brontosaurus into it.

Go back to the starting location and climb up the well-worn path to the cave. If you DROP the mirror the moment you encounter the cavemen, the brontosaurus will emerge and frighten them away and enable you to enter the cave system.

In the store cave is a dinosaur egg with the hourglass symbol on it: Take it and go exploring – I'm going to leave you to do the necessary mapping here, it's not difficult. You need to collect the pebble, pot and club now; in the trophy cave throw the pebble at the animated skeleton to break it.

Get the onyx figurine from the treasure vault and go to the bridge over the crevasse where the woman is struggling with the caveman. Throw the club to enable her to escape and she will reward you with a gold

nugget. You need some verbal dexterity to deal with the invention area: The Archimedes' call-sign *Eureka* is the open sesame to the alcove, where a rearrangement of the writing on the wall produces *James Watt* – rather than *Mene Mene Tekel Upharsin* – and your exit back to the clock.

To tackle the fourth age – the Viking era – successfully you will need to take the fur coat and the shovel along with you. North from the beach you discover a longship and a shivering guard who will be so grateful for the fur coat that he gives you a *lur*. A what? I hear you ask – a lur. He also gives some useful advice. You will now need to take your shovel to the old musty dry cave and do some digging in order to obtain vital directions.

Next you must go to the low cave with the rocking stone which you PUSH so that you can go west to the sloping passage. Following the instructions you unearthed leads you to Pirate Pete's hideout – he's obviously got a secret way in from **Colossal Adventure**.

If you OPEN the chest, Pete will obligingly appear and if you then BLOW the lur he will be captured and you'll get the olive branch. Enter the chest, and you'll find whatever goods Pete stole and a handle which, if you PULL it, lands you back in the clock.

I suggest you pause for breath at this point and come back next month.

A joke for the bored

To gain entry to Part 2 of **Bored of the Rings** you need to enter the password *Psychoanalysis* exactly as written. Any deviation and you'll be unceremoniously dumped out. This section starts with a lovely spoof on a classic puzzle, though I suggest you begin by moving up – just to enjoy the joke – before going east twice to the Tourist Office. There's a battery here that you need to take back west to the large cavern: Insert the battery into the vending machine and you'll be rewarded with a coin.

Now go south to the pixie's cave, move the mat to find the key and then buy the map from the pixie. Examine the map and you'll be shown the moves needed to get safely through the Maze of Morona. However, first you must unlock the door to the secret room west of the pixie's cave. Take the rifle, move the rug and descend to the secret chamber for the treasure to be found there.

Back you go to the pixie's cave and continue east into the maze. The moves needed to navigate your way successfully are E, N, E, E, S, W, S. Next move east to find the poster, and now go west twice, then south to the Dark Halls of Morona.

From here move west into the large chamber and drop the poster so that the Gays don't impede your progress north to the bridge. Cross the bridge and PUSH RED to kill the Balhog: The fact that you also dump Grandalf should be seen as a bonus – in spite of his angry moans as he plummets away into the depths.

After that, move south twice to the foot of the Whiffy Mountains and then west to get the rope. East twice from here brings you to the magical realm of Delorean where you receive a special ID. Plant the beans here to gain extra points.

We are nearly at the end of this section now: South takes you to the leafy glade and then you should move east, south, west and then east twice to bring you to the bank of the stream and the raft. Board the raft and then use WAIT, LOOK and similar time-wasting entries until you land at the camp site.

Leave the raft and dispose of the Nazal by firing the rifle at it then board the raft at once. Now wait around some more until you reach land again. Collect the coin and go west to the clearing and then climb the mountain.

At the summit you should insert the coin in the telescope and then retrace your steps to where you found the coin. A Basilisk will greet you with the information that the word HOG is a rope retrieval device – very useful in Part Three.

Board the raft once more and you will be told that you have successfully completed this section. The password this time is *Psychoanalysis again*, and once more it is essential to enter it exactly as written. Conclusion and postscript next month.

Sweet revenge

As far as I know, Colin Jack has only written two adventure games, **Programmer's Revenge** and **Oxbridge**. Both were first rate and contained some fiendish and amusing puzzles. As Oxbridge is still fairly new, I'm going to concentrate on the other game for the time being, though you can anticipate a full treatment of it in due course.

The objective of Programmer's Revenge is perfectly straightforward – find all the treasures, store them in the trophy room and then complete the final puzzle. Beginners to adventuring should note that, where treasure is involved, there is usually a specific place for storing it if full points are to be collected. The usual convention is to award points for finding an item and more for storing it in the right place. There's nearly always a strong hint on the correct location: In this case

Turn to Page 62 ▶

ADVENTURING

◀ *From Page 61*

the name trophy room is the hint provided.

You start off in the living room of a house and should go north and west to the trophy room where you'll find a formidable broadsword. Take it. Next go up the stairs and up again into the attic. Take the knapsack and the whisky – but don't imbibe – and for once notice that the knapsack is *not* a means of carrying extra items – you can manage a maximum of six – but not a parachute. Move down and north into the toilet and break the panel with the sword then go west, take the wire and go down into the priest's hole. Take the talisman you will find there and retrace your steps to the trophy room and leave the talisman as your first treasure for three points.

Next go to the hall, drop the sword, knapsack and whisky then go east to the kitchen. Open the pantry door with the wire and move south to take the steak and cake. You can discard the wire.

You are now ready to explore the garden and orchard: Move south and then SW to the house picture and from there S, N, NE, NW, W, S, S, NE, NW and E to get through the garden and vegetable garden and arrive at the path.

Go east to the greenhouse where you'll find a hungry triffid – throw the steak to it. You can now proceed east and take the orchid. Next move west repeatedly until you reach the apple orchard and SHAKE TREE, after which you should LOOK to discover the apple and take it.

Go SW and shake this tree and LOOK to obtain the lemon: After this if you want a bit of fun go east and SE and shake that tree. Then go east and south but *don't* shake the coconut tree – unless you SAVE first – but instead take the key.

Moving SE from the coconut tree brings you to the scum-covered pond. The solution is to throw the cake – which is made of soap – into the pond in order to dissolve the scum and reveal the crown when you LOOK. Take the crown and return to the apple tree.

Now move N, N, NW, E, SW, SW, N, N, W and S to get back to the house picture and then go NE and north into the pantry. Go to the trophy room and deposit the orchid and crown – five and four points respectively – then enter the hall and take the whisky in preparation for the next part of the adventure.

To be continued.

FREE

with every computer we sell . . .

. . . our expertise!

If you are buying a new Archimedes or Master Series computer, you don't expect to know all about it from day one. That's where we come in. We don't leave our customers high and dry with their problems – they know they can rely on us to get them out of trouble. Whether it's hardware or software, we're the people who know.

Acorn R140 Unix Workstation

Cambridge Z88 Portable

THE DATA STORE

6 Chatterton Road, Bromley, Kent
Tel: 01-460 8991. Fax 01-313 0400
(closed Wednesday)
An old-fashioned specialist computer shop

WORLDS WITHOUT WORDS
STRETCH
DINOSAUR DISCOVERY
SNATCH
BIG CALCULATOR
DRAGON WORLD
ZOOPAK
BOX OF TREASURES
BUSH RESCUE
TELE-BOOK

SEND A5 22p SAE FOR BROCHURE OF OUR RANGE OF QUALITY EDUCATIONAL SOFTWARE PACKAGES
4MATION EDUCATIONAL RESOURCES, LINDEN LEA, ROCK PARK, BARNSTAPLE, DEVON EX32 9AQ. TEL: 0271 45566

GRANNY'S GARDEN
FLOWERS OF CRYSTAL
4Mation

U·P·D T·E

ICAL opts for UK authoring system

A BRITISH educational authoring system which is used to produce courseware for the BBC Micro has scored points against its main American rival because of its reliability and ease of use. TopClass, from Derbyshire-based Format PC (0773 820011), has been adopted by the Intelligent Computer Aided Learning consortium as a running mate to the American system Accord, which the consortium has used since 1987. This decision follows technical problems with Accord which can be complicated to work with and will not operate on some terminals.

The introduction of TopClass means that consortium members can create software that can be shared among its members as well as being made commercially available in order to fund further courseware development.

Format has already commissioned teachers to design courses on maths and science subjects. Chichester College has developed a health care course and other colleges have used the system for B Tech business courses. These are being marketed through Format's courseware clearing house.

ICAL is made up of universities, polytechnics and colleges. It aims to improve CAL technology by developing effective and easy-to-use tools.

Managing director of Format Geoff Glossop said: "We are delighted that the ICAL consortium has chosen TopClass. It's a shot in the arm for British software. Not many people realise that TopClass is now the most widely used authoring system in further and higher education with about 300 hours of courseware available, much of it for the BBC Micro. The ICAL initiative is a big step forward and will get our full support".

A single 20 minute course on disc sells for around £30 while a GCSE maths course which can be networked costs £150.

Arc programs for BBC Micro

SCHOOLS which have many BBC Micros but only a limited number of Archimedes machines can now achieve software compatibility between the two, claims Dabs Press (061-766 8423) for its new compiler ABC65.

It is an Archimedes to 6502 cross-compiler running on any Archimedes which will convert BBC Basic V programs tested and running on the Archimedes into stand-alone 6502 machine code which can be run on any BBC micro.

"Programs written for the Archimedes can, with a few limitations, be run on a BBC Micro thereby giving it near Basic V capabilities", said Bruce Smith of Dabs Press. ABC65 comes with two discs and a 150-page user guide. Written by Paul Fellows, it costs £69.95.

Dabs Press has also launched ABC Dynamic Extensions, a series of enhancing utilities for its Archimedes Basic Compiler. It includes three programs, Library Maker, Cross Referencer and Profiler and costs £49.95.

Happy micro birthday to you

BIRTHDAY cards produced by primary school children using the latest micro technology went on show recently during Berkshire's popular BEAM (Berkshire Education Achieving More) Week.

Berkshire recently introduced Archimedes machines into its schools and 12 pupils from Geoffrey Field Junior School, South Reading demonstrated what can be achieved by designing cards using the Artisan art package from Clares Micro Supplies. The children also held live design-ins in the town's busy Broadstreet Mall.

"The Archimedes micros are very easy to use and give a new dimension to primary education allowing children to design and create imaginative and adventurous work", said their acting deputy head Julia Radford.

Master teaches French to deaf

CHILDREN who are profoundly deaf and have little or no speech are learning French thanks to the BBC Master, which is a vital part of their special unit at Icknield High School, Luton.

With the help of programs French Mistress from Cosmos Software and A Vous La France from BBC Publications the youngsters benefit from the visual aspect of computer aided learning.

Their teacher, Gill Thomas, is a firm advocate of this kind of tuition and has been leading the campaign for French in the curriculum for the hearing-impaired spurred on by her Head of Service Sandra Dowe and the enthusiasm of her pupils.

"Our emphasis is very much on comprehension of the written word", she told *The Micro User*. "Because we deal with small numbers, computer learning is very practical. I find it an excellent medium because it is totally visual and is very flexible for children with varying abilities".

The youngsters recently had the chance to see French culture at first hand when eight of them joined a school trip to Paris where they met pupils of Cours Morvan, another school for the hearing impaired.

Coinciding with the 200th anniversary of the

Turn to Page 64 ▶

'ICAL's choice of TopClass is a shot in the arm for British software'

Bringing attention to three missing Rs with an omitted N

◀ *From Page 63*

French Revolution, it was a real taste of liberté, egalité, fraternité. They enjoyed freedom from schooling, the equality of being with hearing children and the twinning of the two schools and two nations. It was also an ideal opportunity to compare British and French sign languages.

Young Business People awards

NINE months work by 500 sixth formers from schools throughout Britain ended on June 30 with the finals of the Young Business People of the Year awards held at the headquarters of the Institute of Chartered Accountants in London.

First prize of £5,000 went to Penglais High School, Aberystwyth. Second with a cheque for £3,000 was Raynes Park High and £1,000 for third place went to Bradford Grammar. Three runners-up, Royal Grammar School, High Wycombe, St Pauls School, London and Richard Taunton College each received £500.

Featured in the July issue of *The Micro User*, the competition is designed to promote computer aided learning and is sponsored by catalogue retailer Argos and accountants Coopers & Lybrand.

Sixty per cent of marks in the final went to the teams efforts with business simulation Beat The Boss and for 40 per cent of the marks, pupils had to prepare a presentation for shareholders.

Curriculum comes first

SPECIAL emphasis has been placed on the needs of the national curriculum in the latest catalogue of software teaching resources from Chalksoft (0775 69518). It includes learning aids, practice programs, open-ended adventures, simulations and desktop software to enhance topic work.

Baker asked to back the three Rs

AN appeal has been made to the Minister of Education to over-rule "trendy" authorities who are refusing to sanction the use of a new software program in their schools because it emphasises the three Rs. Tameside teacher Shelley Gibson has written to Kenneth Baker urging him to hit back against the bias of Left-wing eduationalists by including the program in the national curriculum.

At the centre of the controversy is Fun School 2, a software package written by ex-teachers working for Database Educational Software (0625 878888). Developed using traditional teaching techniques, it is available in three age-defined sections for the under-sixes, six to eight-year-olds and over-eights.

It contains a suite of eight programs which range from counting teddies through to solving puzzles, all based on improving a youngster's knowledge of reading, writing and arithmetic.

Although Fun School 2 has proved so popular with parents and children that it has become the first educational program to enter the best-selling software charts, it has been rejected as a teaching aid by a number of education authorities despite a groundswell of support from teachers.

Shelley Gibson has been using the program in her class at Poplar Street Primary Shool, Audenshaw, Manchester. "The children love it because they are not only learning but having fun at the same time", she said. "It's become so popular that it is now often used as a classroom reward.

"I feel very strongly that certain officials are attempting to prevent this going into schools. After all, the national curriculum states that more use should be made of Information Technology and that's exactly what Fun School 2 does remarkably well. That is why I decided to place the ball in Kenneth Baker's court".

SUMMER SPECIALS

5¼" DISKS AND BOX OFFER

25 5 1/4" DS/DD +100 Cap. Box £11.62
50 5 1/4" DS/DD +100 Cap. Box £16.50
75 5 1/4" DS/DD +100 Cap. Box £22.50
100 5 1/4" DS/DD +100 Cap. Box £28.50
All disks 100% certified & guaranteed
All boxes inc Lock & Dividers

3½" DISKS AND BOX OFFER

20 3 1/2" DS/DD +80 Cap. Box .£20.00
40 3 1/2" DS/DD +80 Cap. Box .£34.50
50 3 1/2" DS/DD +80 Cap. Box .£40.00
70 3 1/2" DS/DD +80 Cap. Box .£54.00
All disks 100% certified & guaranteed 135TPI
All boxes inc Lock & Dividers

DISK BOX SPECIAL

Inc. Locks & Dividers

3 1/2" 50 Capacity £5.25
3 1/2" 80 Capacity £6.50
3 1/2" 100 Capacity £6.95
5 1/4" 50 Capacity £4.95
5 1/4" 100 Capacity £6.50

DATA SWITCHES

2-Way 36 Pin Cent £14.50
2-Way 25 Pin D-Type £12.50
X-Over 36 Pin Cent £19.22
X-Over 25 Pin D-Type £18.22
All metal case with rotary switch

DATA SWITCHES AUTO

5 to 1 Parallel £75.00
5 to 1 Serial £75.00
8 to 1 Parallel £95.00
8 to 1 Serial £95.00
All with manual override

DATA CABLES

IBM 25M–36M 2Mtr £7.25
Cent 36M–36M 2Mtr £8.25
RS232 25M–25M 2Mtr £7.25
RS232 25F–25M 2Mtr £7.25
BBC 26IDC–36M 2Mtr £4.50

DISK DRIVES

5 1/4" DS/DD 360K JVC £59.00
5 1/4" DS/DD 1.2 Meg Chinon £64.00
3 1/2" DS/DD 720K Chinon .£59.00
3 1/2" DS/DD 1.44 Meg Chinon £72.00
3 1/2" to 5 1/4" Converter Bracket ..£13.75
All Drives uncased

UNINTERRUPTIBLE POWER SUPPLIES

350 VA Slimline *10/22 ....£287.00
400 VA *5/15 .....£298.00
550 VA Slimline *7/15 .....£350.00
800 VA *5/15 .....£556.00
1000 VA *5/12 .....£625.00
Transfer time <4 milliseconds.
Overload protection.
Line surge protection.
Noise attenuation.
British standard output sockets.
6 feet power cord with plug.
*Load times full/half load.
Protects your computer system from power problems, no more loss of data due to power failure.

PRINTER BUFFERS

64K 1 I/P to 1 O/P £70.00
64K 2 I/P to 2 O/P £120.00
256K 1 I/P to 1 O/P £140.00
256K 2 I/P to 2 O/P £190.00
256K 4 I/P to 2 O/P £256.00
All buffers are parallel only

MICE AND ACCESSORIES

Genius Mouse GM-6+ £35.00
Genius Mouse GM 6000 .....£49.99
(Both inc. Dr Halo III menu maker and library, mouse pad and pocket) Ridid Mouse Mat Double Sided £4.50
Mouse Pocket £2.50

PRINTER STANDS

2-Piece Universal £7.95
1-Piece 80 Col. £9.95

ACCESSORIES

A4 Angle Poise Copy Holder£13.50
A4 Desk Top Copy Holder £8.50
12" Tilt & Turn Monitor Stand £10.50
14" Tilt & Turn Monitor Stand £12.50
5 1/4" Head Cleaner + Fluid ...£2.50
3 1/2" Head Cleaner + Fluid ...£3.50
CPU Floor Stand £10.00
3 1/2" & 5 1/4" Library Cases Per 5 .....£4.75

CABLE ACCESSORIES

25F-25F Gender £7.00
9F-25M AT Gender £7.00
25-Way Mini Tester £8.50
25-Way Mini Jumper £8.50
25-Way Null Modem £7.00
25-Way 4 Port Gender £7.90

ALL PRICES INCLUDE VAT & P&P. UK & BFPO ORDERS ONLY

Cheques and Postal Orders to:

24 HOUR ORDERLINE 0597 87784

M C S

Manor Court Supplies Ltd Tel: 0597 87792

Dept. MU9, Glen Celyn House, Penybont, Llandrindod Wells, Powys, LD1 5SY

EDUCATION AND GOVERNMENT ORDERS WELCOME

Art for small hands

Marshall Anderson learns to write in big letters

Product: Stretch
Price: £26.45
Supplier: 4mation, Linden Lea, Rock Park, Barnstaple, Devon EX32 9AQ.
Tel: 0271 45566

SO far the field of micro art and design packages has produced little of use to the primary school. There is the mathematical art of Logo, but design, while an option, is not its prime function. Dedicated art packages tend to be time consuming and frustrating – no one has produced the kind of package that can do for art and design what the word processor has done for language.

Stretch, 4mation's latest package, is one of the first successes in this area because it addresses only a small and specific area of design.

At it's most basic, Stretch produces lines of large print along more than a page of continuous stationery. It is not the first package to do this. However, it is beautifully thought out and executed and, while simple in structure, leaves plenty of scope to develop your own ideas.

The package is divided into two parts: Text editing and font design. The text editing screen is an area that represents the full width – or thereabouts – of the printing area and about a tenth of its potential length. It is divided up into 22 half screens, and horizontal scrolling is selected from a control block down the right of the screen. On to this area you may place text taken from a range of characters that appear in a window at the base of the screen.

The characters can be from one of the 18 fonts supplied and can be freely mixed. Each character is picked up by the pointer and placed anywhere on the screen – rotated, reversed, enlarged, shrunk or stretched.

All these facilities are available instantly from the function key strip and, once an orientation has been selected, all the following characters enter the screen that way. This last feature is a very nice touch as it helps in the construction of strings of, say, inverted or reversed text. Once placed, characters are easily picked up again, manipulated or deleted.

There are up to two different fill areas in any one character and what they contain is selected from the control box. The screen is in mode 1 so three fill colours are available, plus the background. There are various hatched combinations and a total of 10 fills in all.

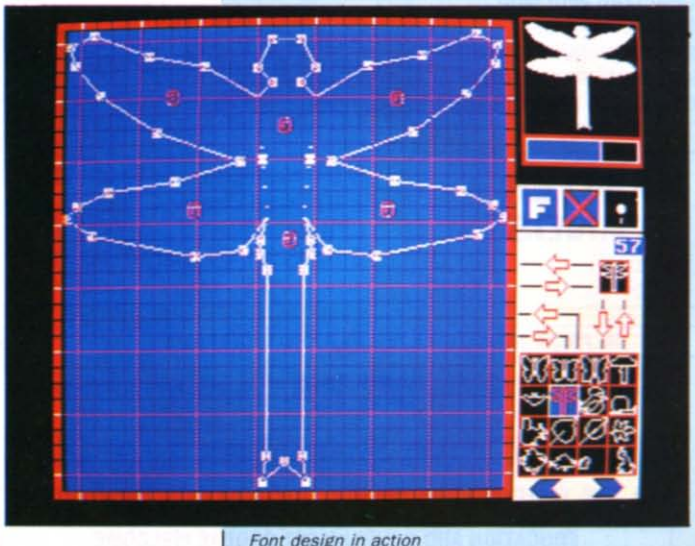
You can get a wider view of the piece you are working on in the preview mode – a sort of Cinemascope – which shows about 40 per cent of the total length of the strip. Editing facilities here allow operations on more than one character – blocks of text can be moved, stretched, deleted or aligned. Strips may, at any time, be saved to disc.

Output can be to almost any printer, with a wide range of options for size and density. Colour is best and if you have it the results can be excellent, but there's no reason not to use standard ones – it's what most of us still have.

Up to this point we have a fairly useful utility for producing banners or posters using the fonts provided. The versatility of the package lies, however, in designing your own fonts. There is no reason why font characters should be letters, and to get you going two sets of symbols are provided. These include many of the icons we have come to expect, pointing fingers, telephones, micros and so on – but also a variety of borders, frames and other useful design bits and pieces.

Further to that, the design potential of the font editor is demonstrated with the production of butterflies, plants, a squirrel, a magician and a legless duck. The important thing about these characters is that they are not dinky little user-defined jobs that enlarge into something that looks like it's made out of carpet tiles. Once on the text editing screen they enlarge into full screen sized pictures and the secret of that lies in the font designer.

This part of the package uses a screen the size of the text editor and all characters are designed to be that size. The character is created using a



Font design in action

rubberbanding technique, the basics of which are soon revealed, and there is no problem producing any simple shape you wish. Things do get a little ticklish if you want to create characters that are split or contain "islands", but a little practice will get you going.

Movement around the screen is via a pointer that may be keyboard, tracker ball or mouse driven. While the mouse was great for the font design part of the package, our rather beaten up rodent caused problems for children trying to place things accurately on the screen as it just would not hold still. The keyboard seems to be a thoroughly respectable option for this package.

Because of the ease with which you can create new fonts, this becomes a design package in which symbols may be developed and then organised in a very creative way.

As a tool in the classroom the potential is huge. Some teachers will see its value in producing high quality lettering for display, others may create symbol fonts to go with a given topic and let the children use them for designs, yet others will give children access to the whole package, the manual gives plenty of ideas for using the program.

Over a period a school will be able to build up a library of fonts to be used on different occasions. It should also be a useful entry point for micros in art in the primary school because of the way it splits the design process down into stages, each of which should be within the grasp of the child.

Putting together a frame

Summing up

The versatility and potential of this package makes it an indispensable tool for all schools that have the equipment to run it. It will also be of great value to any small organisation that needs good quality large lettering quickly and often.

Micro in a microcosm

Product: A Simple Guide to the BBC Computer and its Use in School.
Price: £3.00 (£8.00 for a photocopyable one)
Supplier: Hazeldown Primary School, Maudlin Drive, Teignmouth, Devon TQ14 8SE.
Tel: (0626) 772901

Marshall Anderson checks out a guide for beginners

AN interesting publication this, and from an interesting place. Hazeldown Primary School have published what seems to be their school guide to BBC Micros, and jolly good it is too. There's nothing posh about it, being printed on unassuming coloured paper, the sort that county circulars always come on and its 29 pages are stapled together. But it works.

The book deals with connecting up, switching on, care of equipment, discs and users and the host of disc management tasks one might occasionally have to carry out. There is also a useful glossary and a very perfunctory add-on guide. If you are reading this article it is unlikely you will need any of the information in this book – you'll know it all – but if you have responsibility for IT and a class you'll love it.

It covers just about all those irritating requests for information you get from colleagues during the day, or more specifically half way through a particularly messy art lesson, where they expect an answer by return on the scrappy piece of paper supplied. Just send them the book.

Having said that, there are drawbacks. The first is unavoidable – the book is unable to cover all the different configurations of equipment you will have, for instance the formatting section assumes a 1770 DFS – you will need to customise for your own systems.

The second drawback is really a howling omission, there is no fault-finding guide. We all keep promising ourselves and staff something along these lines, a flow chart or a sort of choose you own adventure with *Is the little red light on?* type questions, if Martin Gallagher and the denizens of Hazeldown Primary School had added this, maybe as a pullout section, their victory would have been complete. Still, well worth having.

EPROMS, 8271 Etc.

	Ex VAT	Inc VAT
1-9 27128 250nS 21V	5.00	5.75
10+ 27128 250nS 21V	4.40	5.06
1-9 2764 250nS	2.77	3.19
1-9 27256 250nS	4.80	5.52
1-9 8271 controller	38.26	44.00
10+ 8271 controller	34.00	39.10
1-9 6264 LP 150nS	6.00	6.90
Acorn 8271 DFS	45.22	52.00
Acorn 1770 DFS	45.22	52.00
Turbo upgrade	98.78	113.50
Peartree MR8000	43.43	49.95
RISC OS upgrade	29.00	33.35

ROMS/SOFTWARE

	Ex VAT	Inc VAT
Inter-Word	35.65	41.00
Inter-Base	46.96	54.00
Wordwise Plus	37.39	43.00
MEGA 3	71.30	82.00
Spell Master	40.00	46.00
Artisan	30.43	35.00
DTP-Acorn	127.83	147.00
ViewStore	35.65	41.00
OverView I & II	68.70	79.00

Phone for BBC/Archimedes Software catalogue 100's of titles inc. Edu.

MONITORS

	Ex VAT	Inc VAT
Philips CM8802	173.04	199.00
Philips CM8852	216.52	249.00
Philips BM7502 Green	62.61	72.00
Philips BM7522 Amber	73.91	85.00
Philips TV Tuner	60.00	69.00
Taxan KX Amber	82.61	95.00
Taxan KX1201 Green	68.69	79.00
Microvitec 1431	173.04	199.00
Microvitec 1451	216.52	249.00

(Prices inc. BBC Cable)

MASTER/ARCHI

	Ex VAT	Inc VAT
512 CO. Processor	173.04	199.00
Master 128K Micro	404.35	465.00
Archimedes 410/1	1191.30	1370.00
Master Compacts from	330.43	380.00
Master Cartridges	8.65	9.95
Reference Manuals	14.00	14.00
View 3/View Sheet Guides	9.00	9.00
Master & B Dust Covers	3.00	3.45
BBC B's from	152.17	175.00

Big discounts on Master/Archi Systems. Educational Discount prices phone.

Philips CM8833

with BBC cable

£215.00 (£186.97+VAT)

VOLTMACE JOYSTICKS

	Ex VAT	Inc VAT
Delta 14B single	12.61	14.50
Delta 3B single	11.26	12.95
Delta 3B twin	17.35	19.95

Taxan 770+

with cable

£494.00 (£429.70 + VAT)

STAR LC2410

with BBC cable & paper

£315.00 (£273.91+VAT)

Star LC10 Mono

£169.00 (£146.96 + VAT)

Colour

Colour Dump £219.00 (190.43 + VAT)
Rom £39.95 inc. (with Cable and Paper)

PANASONIC KXP1081

with BBC cable & paper

£149.00 (£129.57+VAT)

Taxan KP815

With BBC cable & paper

£175.00 (£152.17 + VAT)

PANASONIC KXP1124

(24 Pin)

with BBC cable & paper

£299.00 (£260.00+VAT)

CANON PW1080A

with BBC cable & paper

£159.00 (£138.26 + VAT)

PANASONIC KXP1180

with BBC cable & paper

£179.00 (£155.65+VAT)

EPSON LX 800

With BBC cable & paper

£179.00 (£155.65 + VAT)

CITIZEN 120D

with BBC cable & paper

£125.00 (£108.67+VAT)

EPSON LQ400

Phone for price

Acorn Bitstik

+ Software (5 only)

£199.00 (£173.04 + VAT)

PRINTERS/CABLES/Etc.

	Ex VAT	Inc VAT
Canon A55 (17"w)	260.00	299.00
Epson LQ850	426.01	490.00
Juki 2200 D/W	233.91	269.00
Amstrad LQ3500di	247.83	285.00
1.5m (4 foot) BBC cable	4.00	4.60
2.0m (6 foot) BBC cable	6.00	6.90
Compact printer cable	6.00	6.90
IBM/Archimedes cable 1.8M	6.00	6.90
LX/LQ Sheet Feeder	62.61	72.00
LC10/LC2410 Sheet Feeder	51.30	59.00
2 way Printer Switch	18.00	20.70
Printer Dust Covers	4.00	4.60

PRINTER RIBBONS

	Ex VAT	Inc VAT
LX800 & FX800 Print Ribbon	2.30	2.65
LC10 Print Ribbon	4.00	4.60
120D Print Ribbon	4.00	4.60
Taxan/Canon Ribbon	3.22	3.70
Juki 6100 Print Ribbon	1.30	1.50

Phone for full range 100 + original & Compatible ribbons + Bulk discounts

DISKETTES (100% Error free)

(lifetime warranty)

	Ex VAT	Inc VAT
10 Banana Reversible	8.65	9.95
10 3.5" D/S 135tpi	7.39	8.50
50 3.5" D/S 135tpi	34.80	40.00
100 3.5" D/S 135tpi	67.83	78.00
10 96tpi D/S D/D in box	5.17	5.95
50 96tpi D/S D/D in boxes	17.17	19.75
100 96tpi D/S D/D in boxes	32.09	36.90
10 3M High Density 3.5"	25.00	28.75
10 3M High Density 5.25"	12.00	13.80
100 Disc Box 5.25"+ lock	6.52	7.50

5¼ DISC DRIVES

	ExVAT	InVAT
Cumana CSX100 40T	74.78	86.00
Cumana CSX400 40/80T	89.57	103.00
Cumana CDX 800S 40/80T	175.65	202.00
Cumana CD800S 40/80T	195.65	225.00
MD400A 400k No PSU 40/80T	78.26	90.00
MD400B 400k & PSU 40/80T	88.70	102.00
MD802C 800k No PSU 40/80T	156.52	180.00
MD802E 800k & PSU 40/80T	169.57	195.00
MD802D 800k & stand 40/80T	190.43	219.00

Phone for Hard discs + Torch

Phone for our best price before placing your order
EDUCATIONAL & GOVERNMENT ORDERS WELCOME
All products have a 12 month no quibble guarantee
Prices subject to variation without prior notification
We are closed Saturday afternoons
Postage 92p (80p + VAT) Securicor £6.90 (£6.00 + VAT)

WeServe

Larger items delivered by Securicor

Micro Dept.
128 West Street,
Portchester,
Hants.
PO16 9XE
Tel: 0705 325354

Upgrading to 16 bit?

Whether you're about to buy an Atari ST, an Amiga or a PC, we've got just the magazine for you.

Atari ST User, Amiga Computing and PCA are THE three top magazines dedicated to 16 bit micros. Written in the easy-to-read Database style, each magazine is the ideal companion for the micro it covers.

ATARI ST USER

£2.95

The biggest and fastest growing magazine for users of the Atari ST.

It's packed with all the information you need to make the most of your ST, interviews with top ST programmers to exclusive previews of the latest business and games software.

DISC included

AMIGA COMPUTING

£2.95

Britain's newest and brightest magazine for Amiga Users.

In each issue are reviews of all the latest software, ranging from games, art packages and bsuiness programs, to video titling systems, music cretors and languages. Learn about the Amiga's incredible sound and graphics capabilities, and how to write your own games, utilities and business software.

DISC included

PC

£1.95

The most up-to-date, fact-filled magazine devoted to the IBM PC, Amstrad PC and compatibles.

Each month it's packed with facts about the latest software, handy utilities, fast-action games, music programs and much, much more. There are thorough evaluations of all software and hardware, beginner's tutorials and language workshops, plus unbeatable special offers.

DISC included

Save

£5

UK only

As a reader of The Micro User if you subscribe to any of these magazines using the form below, we'll give you a £5 reduction.

So send off your subscription today. Ensure you get your copies delivered straight to your door – before they appear in the newsagents – and save money too!

ORDER FORM

Please send me the next 12 issues of

☐ Atari ST User £29.95 (9344) ☐ Amiga Computing £29.95 (9557)
☐ PC £18.00 (5456)

Please tick your selection and payment method.

☐ *Cheque payable to Database publications*
☐ *Access/Visa account number:*

Expiry date /

Signed _____

Name _____

Address _____

_____ Post Code _____

Daytime telephone number _____

Send to:
Database Direct, FREEPOST
Ellesmere Port, South Wirral L65 3EB.

Only for UK subscribers

MU9

ARPEGGIO MUSIC SYSTEM

Great new sounds for your ARC!

Creations Sample Library

Use them with EMR programs or your own...

Free WFS on disk 1 lets you use BASIC or Machine Code to install sounds - works with Acorn Music Editor Maestro too!

Creations Disk 1 Ideal first set of 34 mixed sounds+WFS

Creations Disk 2 38 Orchestral and Acoustic Instruments

Creations Disk 3 27 Animal noises and human voices

Creations Disk 4 28 Spectacular Sound Effects (1)

Creations Disk 5 22 Spectacular Sound Effects (2)

Creations Disk 6 42 Pop,Latin & Orchestral Percussion

Price each only £9.95 inc VAT. Add £1 P&P.

Special Offer! Buy all 6 sample library disks and get one free - every sound is different - price £49.75 inc.

Symphony Music Library

A complete music demo for Arc internal sounds in stereo (supplied) or Midi instruments (with a suitable interface). SYMPHONY 1 now available - disk autoboots and plays while screens give information about making music. Pieces can also be used with STUDIO 24 PLUS.

Price each only £9.95 inc VAT & P&P.

Arc sound output cables for hi-fi connection - only £4.95 inc VAT&P&P

ElectroMusic Research (EMR) Ltd, 14 Mount Close, Wickford, Essex SS11 8HG. Telephone: 0702 335747.

MASTER 512K UPGRADES

We have recently acquired a very limited number of brand new Master 512k upgrades. These are genuine Acorn products consisting of the 512k PCB. Mouse, DOS & GEM software. This could be your last chance to upgrade your Master to DOS compatibility.

The price per unit is **£199.00**
(£235.75 inc VAT & Delivery)

ALSO:
BBC Master 128. Price per unit **£369.00**
(£435.85 inc VAT & Delivery)

01-650 9152

Telephone for prices on other equipment
Delivery Charge: Computers £10.00. All others: £6.00
+ 15% VAT to all orders
To:

VMS Enterprises Ltd
Unit 1, Bouverie Lodge
Rectory Road, Beckenham
Kent BR3 1TU

MICRO MEDIA Computer Supplies Ltd.

ALL PRICES INC. OF DELIVERY AND VAT – ALL PRICES INC. OF DELIVERY AND VAT

5¼ Unbranded Discs

Price per	25	50	100	250
SS/DD	8.90	14.90	26.88	61.90
DS/40T	9.90	15.90	27.88	63.00
DS/80T	10.90	17.90	32.96	73.50
DS/HD PCAT's	23.90	39.90	73.88	173.20

5¼ Colour Discs (5 colours)

DS/40T	12.45	23.5A	38.92	89.20
DS/80T	13.45	25.94	46.20	97.50

5¼ Reversible

DS/40 & 80T	14.50	26.94	49.48	107.20

Price per	10	20	50	100
3½ DS	10.90	20.94	46.15	86.00

5¼ MICRO MEDIA Brand Discs

SS/DD	5.75	10.90	25.50	46.50
DS/40T	6.75	12.74	29.85	57.20
DS/80T	8.50	15.96	36.25	71.30
DS/HD PCAT's	14.50	27.90	66.50	127.20
Reversible	8.50	15.96	36.25	71.30

All discs supplied are with labels 5¼" write protects, envelopes & hub rings. 100% certified error free. Lifetime guarantee.

3½ MICRO MEDIA Brand Discs

DS 135TPI	14.15	27.30	64.80	124.00
DS HD 2MB	36.90	70.60	167.95	311.50

Printer Ribbons

Price each Ribbon	2	6	12
Canon 1080/1156 R,BL,GR,BR,Y	3.99	3.85	3.70
Centronics GLP R,BL,GR,BR,Y	3.65	3.45	3.15
Citizen 120D/LSP10	4.65	4.40	4.00
Epson MF & RX80 F & LX800 R,BL,GR,BR	3.60	3.40	3.25
Epson LX80/86 GX80 R,BL,GR,BR,Y	2.99	2.75	2.55
Juki 6100 MS R,BL,BR	2.80	2.65	2.40
Kaga KP810/910 R,BL,GR,BR,Y	2.85	2.70	2.60
NEC P2200	2.95	2.80	2.70
Panasonic KXP1080/1/2/3	2.99	2.85	2.60
Star NL10 R,BL,GR,BR	3.99	3.85	3.70
Shinwa CP80MS	4.95	4.60	4.25
Star LC10 R,BL,GR,BR	3.99	3.80	3.60
Star LC24-10	6.50	6.20	5.85
	3.99	3.80	3.60

Please mix colours and types for best prices.
R = Red, BL = Blue, GR = Green, BR = Brown, Y = Yellow

If the ribbon you require is not listed please let us quote.

Computer Paper

Plain fanfold, micro perf edges

Size	Weight gsm	1000's per box	Price per box 1 box	3 bxs	5 bxs
11x9½	60	2000	14.95	14.45	13.65
11x9½	70	2000	18.45	16.05	15.15
11x9½	80	2000	20.25	18.55	16.45
A4 11⅞x9¼	70	2000	20.95	19.70	18.45
A4 11⅞x9¼	80	2000	24.55	23.05	20.15
A4 11⅞x9¼	90	1000	14.25	13.15	14.15

Computer Labels

Continuous fanfold, sprocket fed

Price per 1000	1000	3000	5000
70 x 36.2 (4x1⅜)	4.85	3.85	3.55
89 x 36.3 (3x1⅜)	5.35	4.50	4.10
89 x 49.3 (3½x1⅜)	6.60	5.90	5.40

Please state no of labels across sheet (1, 2 or 3)

Disc Storage Boxes

Price each	1+	3+	6+
MD 120 5¼ x 120	9.95	8.95	7.60
MD 100 5¼ x 100	8.90	7.99	7.40
MD 50 5¼ x 50	6.10	5.65	4.80
MD 80 3½ x 80	8.90	7.99	7.40
MD 180 5¼ x 180	19.90	18.90	17.95
MD 150 3½ x 150	20.95	19.25	18.90

Printer Stands

	Price each
PS10 80 col	28.50 27.25 25.30
Wire 80 col	11.10 9.90 8.95

Swivel Bases

	Price each
12" 55 x 280 x 260 mm	11.90 10.40 9.60
14" 55 x 355 x 320 mm	13.50 11.80 10.90

HOW TO ORDER

BY PHONE LEICESTER 0533 856622
OUT OF OFFICE HOURS 0533 858654

BY POST MICRO MEDIA, DEPT. MU, FREEPOST (NO STAMP REQUIRED) LEICESTER LE3 6ZQ

BY FAX LEICESTER 0533 858932

PERSONAL CALLERS LEICESTER – SORRY NO PERSONAL CALLERS
POTTERS BAR – PERSONAL CALLERS WELCOME – MICRO MEDIA, Rydal Mount, Baker St., Potters Bar, Herts. Mon to Fri 10.00am - 4.00pm

OFFICE HOURS Leic: Mon to Fri 8.30am - 6.30pm

DESPATCH DELIVERY WITHIN 24 HRS PLEASE ALLOW 5 DAYS
For guaranteed next day delivery please phone – from £2.50 EXTRA. Postage covers UK only.

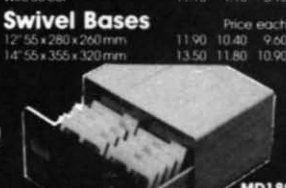
MINIMUM ORDER VALUE
FOR PAYMENT WITH ORDER MIN VALUE £8.90 or £1.50 HANDLING CHARGE.
FOR ACCOUNT CUSTOMERS MIN VALUE £15.00 or £3.00 HANDLING CHARGE

SPRING CATALOGUE OUT NOW
PLEASE RING OR WRITE FOR YOUR FREE COPY

MD120 5¼ x 120 Anti static Lock lid

MD100 5¼ x 100

PS10



MD180 Interconnecting, Stackable
MD180 5¼ x 180 MD150 3½ x 150

Swivel Base Adjusts by front dial turns 360° Tilt up & down 25°

-MICRO MEDIA- TEL: LEICESTER 0533 856622 -MICRO MEDIA- TEL: LEICESTER 0533 856622 -MICRO MEDIA-

Product: Geoscan
Price: £45.00
Supplier: Passkey Marketing, PO Box 649, Shenley Lodge, Milton Keynes MK5 7AX.
Requirements: Acorn Archimedes with minimum 1Mb memory.

The facts of Life

A database of facts about the Earth is examined by Rog Frost

GEOSCAN describes itself as a micro database and program on world development. The package consists of a standard 3.5inch disc plus an A4 sized book of instructions and photocopy masters for teachers' use. The disc contains 174k of information on 100 countries and the means to get at this data in a number of ways.

The countries are well spread out, the only major gap being in Eastern Europe. There are seven main data areas for each, all with many sub-divisions.

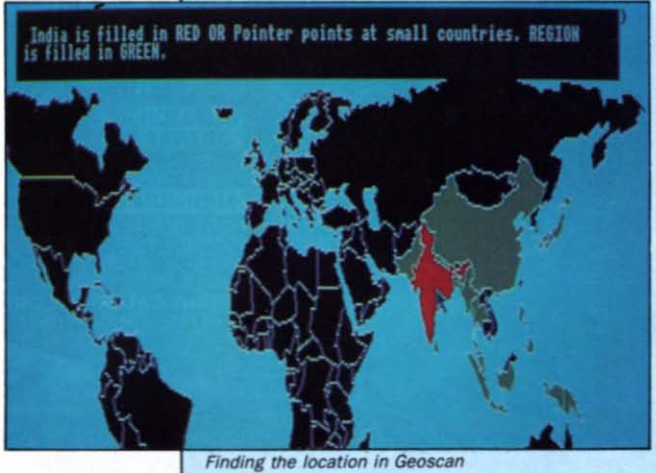
The first area is basic geographical information – the name of the country and the world region it lies in, together with its capital, time zone and the latitude and longitude of the capital. There are also weather statistics for the main city and a descriptive summary of the country's main physical features.

Next comes data relating to land use and agriculture. Similar data is available on industrial development – consumption of energy per head and the importance of industry and services to the economy.

Population data includes the birth rate, the population growth rate plus statistics on where the people live. Health and education is the next topic and this includes the life expectancy, the infant mortality rate and the number of people per doctor. There is information on the food supply, plus proportions of different age ranges who are enrolled in education.

International trade gives statistics on the importing and exporting of a variety of prime materials and manufactured goods. Finally, there is data on the financial status of each country given in US dollars.

Three main methods can be employed for getting at this wealth of information. The simplest is called Factfile which allows the basic geographical data for a country to be collected. All selections are made by mouse-controlled pointers, and clear instructions are always given.



Finding the location in Geoscan

A photocopy master is provided so that pupils can transcribe data from the screen to paper. Here lies the biggest complaint with the program. Printers are not supported, which means all data must be laboriously copied.

The second method for getting data is Profile, which allows students to select which information they require for each country. Again, pointers are used for all options. If you wanted to know the life expectancy in Ethiopia the method would be to select Africa and from the next list, the country.

Colour

ONE of the main obstacles to getting pupils enthused about Logo is its unfriendly start. The Logotron version, which is now the standard, presents a question mark as a prompt and leaves the rest to you. It is, of course, a very powerful language and looks set to form part of the national curriculum for many schools.

It has many existing extensions like control and music, but I suspect that an awful lot of teachers are still fairly alarmed about how their pupils will cope with any variant on the Logo theme.

Turtle Worlds could be the salvation that some reluctant Logo users seek as it converts the boring looking Logo into something bright and colourful by allowing screens to be loaded as backgrounds to have extra work done on them.

The package consists of two discs and a very well written manual. The aim of authors Richard Parker and Chris Morley seems to be to make Logo accessible and easy. All that is needed is to insert the main disc, press Shift+Break and let the software set itself up. After a short wait a very pleasing Turtle screen loads followed by the main program.

The menu gives a list of prepared screens which are on the disc, or prompts for a disc swap. The pictures are based on a supermarket theme with a plan view of the car park, the front of the shop, a plan of the inside, shelves, tins of peas, some fruit and a final picture of loading the car with shopping.

These pictures are only a start, since it is easy to create your own screens and add them to a Turtle Worlds library disc. The program supports pictures created with the Nidd Valley Illustrator, MESU's Click and Picture Builder, Image from Homerton College or any other Mode 1 or Mode 2 screen that has been saved normally. This means the vast majority of BBC Micro art packages can

Then chose Health and Education from the Profile menu and read the data.

The main problem in the process is that the list of countries is in what seems to be a random order. I would have thought that an alphabetical list would have been possible, or even direct selection from a map.

Factfile and Profile are well presented. A high resolution colourful Mode 15 screen is used and all areas are well illustrated with 200k of sprites.

Survey, the third method of gaining data, is more analytical and less descriptive. Three options are possible. Regional averages produce bar graphs over a world map – perhaps of figures of average age of the population. The map allows the locations of the best and worst 15 countries in any field to be identified on map and ranked. Perhaps the most useful feature of Survey is the correlation feature in which any two fields may be compared for all 100 countries. A scattergraph is produced of the data.

The handbook gives full details on interpretation of these graphs and on correlation coefficients.

An update service is promised to overcome the problem of Geoscan data becoming out of date. A returned old disc plus a small but unspecified sum of money will get registered users a new set of data. There is no user interface for putting in your own data. Perhaps future issues could be made easier to boot up. Geoscan is said to configure the micro but I found I needed to organise the system myself or I got a very pleasing error message offering me a new disc.

Summing up

Geoscan is a very useful tool for students of world geography. I particularly like the ease of access to the data and – no surprise on the Archimedes – its speed. The emphasis on comparisons between the countries of the Western world and those of the Third World is particularly useful. The work sheets are well laid out and offer hard-pressed teachers a valuable resource.

Against that must be set the lack of printer option, the start up problem and the rather steep price. Overall I would recommend Geoscan as a worthwhile program for all secondary schools.

crawling

Rog Frost reports on a new front end for Logo

Product: Turtle Worlds
Price: £12.00
Supplier: Turtle Worlds, 7 Springwood Road, Leeds LS8 29A.
Requirements: BBC Micro with Logotron Logo

create a Turtle World picture. I use Watford's Quest Paint which can produce perfect results, although the screens need a little conversion first.

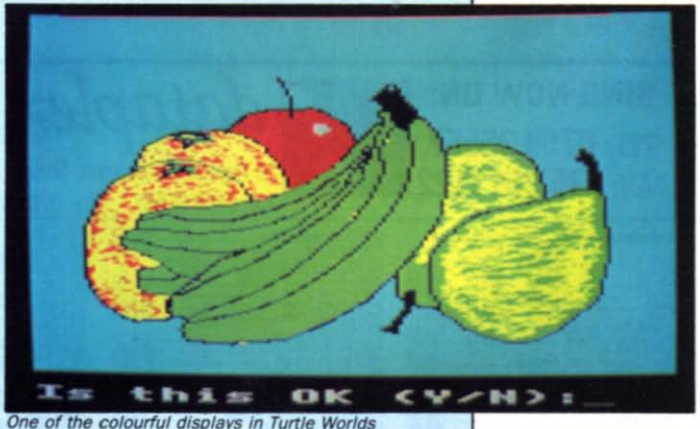
Utilities are provided to convert screens to Turtle Worlds format and these are extremely user friendly.

There are three other main features of the package. Three extra Logo Keywords are provided. SETCOL allows screen colours to be selected – it's equivalent to the VDU19 command but much easier to manage. This is needed to allow Turtle World screens to be displayed in correct colours. RESET sets all colours back to their default values. Another command, PANIC, will regain workspace at the expense of defined procedures, which could be a life saver.

The other two features are designed to make the interface easier to manage. The first, simple method is to define function keys with the more frequently needed keywords. The second technique is to set up a concept keyboard. An A4 overlay Is provided with the pack can be photocopied and enlarged for A3 boards. Turtle Worlds also supports the two commonest floor turtles, the Valiant and Jessop models.

Perhaps the best part of this package is the section in the manual devoted to ideas for its use. Simple ideas they are, and yet they will get youngsters thinking about geometry without realising it as they perform some other task.

An example of what is on offer involves the car park plan. One suggested idea is to move the turtle along roadways to an empty parking lot and then construct a simple plan view of a car. Changing the colour of items on screen – a satisfying process – will require the turtle to be placed inside the object. Distances and angles will need to be estimated for this simple process.



One of the colourful displays in Turtle Worlds

A particularly popular idea is *Colour the fruit so that it looks bad*. A pity the printer option is for black and white Epson compatible devices.

Summing up

For any school with a Logotron Logo lurking hidden inside a machine, Turtle Worlds could be the way to bring it to life. It is thorough, very user friendly and an absolute snip at £12. Thoroughly recommended.

EUCORN

- # ***EUCORN*** *is a revolutionary new generation of musical instrument.*
- # *With it one can perform prescribed pieces of music like a musician.*
- # *Real time control of musical interpretation during performance.*
- # *Runs on Archimedes 310, with amplifier & speakers: printer desirable.*
- # *Disk contains performance program (both BASIC and ABC compiled versions) a music input program, a repertoire of classical pieces (over 2 hours playing time) and detailed 70+ page User Guide as a print file.*
- # *Customers welcome to contact author at any time.*
- # *There is* ***NO CHARGE*** *for* ***EUCORN****: after receipt & testing, it is hoped that customers will donate a suitable sum directly to any recognised charity.*
- # *To obtain the package, please send a 1st class UK postage stamp, a self addressed envelope (UK addresses ONLY) and a 800k formatted 3.5" disk. Software will be copied onto your disk & posted back to you the same day.*

STELLAR ENTERPRISE (Ronald Alpiar),
84 Dudsbury Road, Ferndown,
Wimborne, Dorset BH22 8RG.
Telephone Bournemouth (0202) 575234

contex

Archimedes is a trademark of Acorn Computers Ltd

BANK MANAGER *for disc systems only*
The most advanced and versatile personal bank account management program available for all BBC computers. Consistently acclaimed!
"data entry is a delight. . . professional. . . excellent product"–Micro User *April '86*
Enter cheques and receipts. Standing orders any frequency. Automatic date sequencing. Reconcile statements. Search, amend and delete. Unreconcile. Move forwards or backwards. Analyse expenditure. Forward cash flow forecast. Up to 36 simultaneous 'bank accounts' online, inter-account transfers, 9999 standing orders, 99 analysis categories. 12 actual and 12 budgets per category, over 4,000 postings on an 80tk disc. Reports to screen or printer. Graphics. Foreign currency support. Password. File recovery. Auto exec file. Field editing. Itemised look ahead. Programmable report writer.
Standard Bank Manager for the BBC B, B+ £17.50

BANK MANAGER MASTER *for disc systems only*
Includes all of the facilities of the Standard Bank Manager **plus** ADFS file system support, shadow screens, uses sideways RAM, 40 or 80 column screen reports. Improved graphics, m/c windows, function key support and onscreen labels, additional functions added to the already extensive report facilities.
Bank Manager Master for the MASTER and MASTER COMPACT £22.50

ARCHIMEDES BANK MANAGER
All facilities of Master version plus high speed "native' mode, wild card analysis enquiry, analysis code sort and other enhancements.
"Impressed, ideal, easy to use."–Micro User, *March '88*
Archimedes Bank Manager £25.00

BANK MANAGER BUSINESS UTILITIES *for disc systems only*
For the 'professional' who also uses the BANK MANAGER to control the business accounts the BUSINESS UTILITIES add double entry trial balance and programmable spreadsheet analysis reports. Generated from cheque and cash transactions keyed into BANK MANAGER. Just pass the reports to your accountant! Available for all BANK MANAGER versions state which.
Bank Manager Business Utility Pack 1 £12.00

TYPING TUTOR
Quickly learn to touch type. Over 90 smoothly graded lessons graduate you from the basic home keys to complete keyboard mastery. Unique word scan line checking. Target WPM and percentage correct. Revise the targets or lessons as required. Audio key click for positive key depression. Establish a typing rhythm using the automatic metronone. Free format option. Disc version includes several enhancements e.g. on screen keyboard, exact mode, on screen parameters. Recommended.
Cassette £12.50, Disc for BBC B, B+, Master and Compact £12.50
Disc for Archimedes (all models) £15.00

ALL PRICES FULLY INCLUSIVE FREE POSTAGE WITHIN UK
Enquiries and Access Credit card orders telephone 0234-838347
Please state: cassette, 3.5" disc, 5.25" 40tk disc, or 5.25" 80tk disc and computer type (B, Compact, Master or Archimedes).

CONTEX COMPUTING

(REF. MU)
15 WOODLANDS CLOSE, COPLE, BEDFORD MK44 3UE

RING NOW ON:
TEL: 0753 35557
FAX: 0753 511122

dataplex

10 Petersfield Avenue, Slough, Berkshire SL2 5DN
Tel: 0753 35557 Fax: 0753 511122

Conditions of Sale
- All prices exclude VAT and delivery charges
- E&OE all prices subject to change without notice
- All collections made by prior arrangement from our warehouse
- Please add £1+VAT for consumables and £8+VAT for all other items for next day delivery

ARCHIMEDES – INCLUDING NEW RISC OS

	Basic	Mono	Colour
A305	705.00	765.00	904.00
A310	839.00	979.00	1078.00
A310M	939.00	999.00	1138.00
A410	1179.00	1239.00	1378.00
A420	1679.00	1739.00	1878.00
A440	2509.00	2569.00	2708.00

*0.5Mb Ram for 305	139.00
*Podule Backplane	39.00
*Rom Podule	48.00
*Rom Podule +Bat. Backup	59.00
*Archimedes Ref. Manual	29.00
*2nd Drive for 305/310	119.00
*Backplane for 4 Podules	29.00
*Backplane for 2 Podules	29.00
*I/O Podule	85.00
*20Mb Disk & Controller	469.00
*IEEE Interface	280.00
*PC Emulation Pack	79.00
New 3000 System	589.00
BBC Master 128K	372.00

BBC MASTER 128 PACKAGE
Save over £30.00
BBC Master 128
+5.25" 400k Drive 40/80T
+Philips CM8833 Colour 14" Med. Res. 599.0

ACORN MASTER COMPACT SYSTEMS
Inc. 3.5" Drives

Package 1	
Standard System	305.00
Package 2	
Computer + TV Modulator	325.00
Package 3	
Computer + 12" MI Res.	
Philips Green Screen	356.00
Package 4	
Computer + 14" Med Res.	
Philips Colour Screen	469.00
RS232 Kit for Compact	25.00
Additional 3.5" Drive	89.00

DISK DRIVES FOR BBC

Drives without PSU	
5.25" Single 400K Drive	89.00
5.25" Dual 800K Drive	169.00
3.5" Single 400K Drive	89.00
Supplied in dual height casing for future upgrade	
3.5" Dual 800K Drive	139.00
Combo Drive	204.00
Drives including PSU	
5.25" Single 400K	104.00
5.25" Dual 800K Drive	189.00
5.25" Dual in horizontal plinth, switchable	225.00
3.5" Single 400K Drive	109.00
Supplied in a dual case for future upgrade	
3.5" Dual 800K Drive	177.00
Combo Drive	224.00
All 5.25" Drives are 40/80 Switchable	

DATAPLEX HARD DISK DRIVES

20Mb Hard Drive for BBC	379.00
30Mb Hard Drive	399.00
40Mb Hard Drive	429.00
60Mb Hard Drive	479.00

MONITORS

NEC Multisync GS	139.00
NEC Multisync II	380.00
NEC Multisync IIA	349.00
NEC Multisync Plus	612.00
NEC Multisync 20?XI	1359.00
Packard Bell 14" M/Sync	299.00
Philips BM7502 12" Mono	65.00
Philips BM7522 12" Amber	69.00
Philips 8833 14" CGA	189.00
Philips 8852 14" Hi Res.	249.00
Philips 8873 M/Sync 14"	418.00

SAMSUNG MONO MONITORS
PC XT/AT COMPATIBLE

MA2571 12" FST White	89.00
MA2573 12" FST P39 Green	89.00
MA2575 12" FST Amber	99.00
MA4571 14" FST White	99.00
MA4573 14" FST P39 Green	99.00
MA4575 14" FST Amber	109.00
MI 2611 12" White (PS2)	99.00

PRINTERS

Amstrad DMP3160	89.00
Amstrad LQ3500 DI	244.00
Amstrad DMP4000	227.00
Amstrad LQ5000 DI	329.00
Brother HR20 Daisywheel	318.00
Brother HR40 Daisywheel	688.00
Canon PT 1080 Inkjet Col.	420.00
Dot Matrix Range	
Citizen 120D	110.00
Citizen 180E	127.00
New 24 Pin Swift 24	255.00
Colour upgrade for Swift	POA
Citizen MSP 15E	188.00
Citizen MSP 40	228.00
Citizen MSP 45	252.00
Citizen MSP 50	292.00
Citizen MSP 55	322.00
Citizen Premier 35	364.00
Citizen HOP 40 (last few)	295.00
Citizen HOP 45 (last few)	295.00
All Citizen printers come with 2 year warranty	
Epson LX800	139.00
Epson FX850	283.00
Epson FX1050	377.00
Epson EX800	425.00
Epson EX1000	581.00
Epson LQ500	249.00
Epson LQ850	404.00
Epson LQ1060	542.00

HEWLETT PACKARD

Thinkjet	265.00
Quietjet	343.00
Quietjet+	412.00
Deskjet	443.00
Deskjet+	535.00
Paintjet	665.00
Rugged Writer	865.00

All Hewlett Packard Printers come with 12 months on site warranty. Fully Epson/IBM compatible

Star LC10 Mono	135.00
Star LC10 Colour	195.00
Star LC24-10	252.00
Seikosha SP180	185.00
9 Pin, 80 Column, 100CPS, F/T	
Seikosha SP1200	119.00
9 Pin, 80 Column, 120CPS, F/T	
Seikosha SL80 AI	224.00
80 Column, 24 Pin	
NEC P2200	265.00
NEC P565XL	814.99
NEC P6+80 Character	414.00
NEC P7+136 Character	534.00
Colour Upgrade Kit	80.00
Panasonic KXP1061	128.00
Panasonic KXP1124	249.00
Sheetfeeder	89.00
Panasonic KXP1180	149.00
9 Pin, 11" Carriage	
192CPS Draft,38CPS NLQ	
Bottom Feed Tractor	
Paper Park, F/T, 53dBA Noise	
Epson FX/IBM Compatible	
Panasonic KXP1592	253.00
Panasonic KXP1595	344.00
Panasonic KXP1540	428.00

NEW MANNESMANN TALLY LAUNCH OFFER

MT81 (Dot Matrix)	110.00
Sheetfeeder	62.00
Serial I/F	62.00

- * Incredible Price/Performance Ratio
- * Amazing 8K Buffer
- * 130CPS Draft, 26CPS NLQ
- * Push Tractor Feed
- * Epson FX85 and IBM Proprinter Compatible
- * Flexible Paper Handling
- * Paper Parking for Cut Sheet Feed
- * Optional Sheetfeeder
- * Optional Serial Interface

NEW COLOUR PRINTER FROM OLIVETTI
The Visible Benefits (Dot Matrix)

DM105S	189.00

- * 200CPS High Speed Draft (AT 10CPI) 150CPS Draft
- * 30CPS NLQ
- * Friction & Tractor Feed
- * 5.5K Buffer
- * Standard 4 Colour Ribbon
- * Optional Sheet Feeder 89.00

NEW MANNESMANN TALLY INKJET (Black)

THE MT90 at only	375.00

Longlife 24 Nozzle Print Head, Tractor, Paper Roll + Cut Sheet, Paper Handling
Optional Sheetfeeder 99.00

RIBBONS

KXP 1081/1090/172	4.00
DMP 2000/3000/3160	2.80
DMP 4000	4.40
PCW 8256/LQ 3500	4.50
Panasonic 3131/MP26	4.40
LX 800/RX/MX/FX80	3.15
FX1000/FX/RX100	4.40
NL10	4.40
LQ500/800/850	4.40
LC10	4.40
NEC	5.00

Various selection in stock. Please call for prices
Mouse Pad 4.00

LASER PRINTERS

Brother HL8	1395.00
Brother HL8 QS Postscript	3569.00
Epson GQ-3500	1099.00
Hewlett Pack Laser III	1338.00
Hewlett Pack laser IID	1979.75
Panasonic KXP 4450	1349.40
Qume Crystal Print WP	995.00
Qume Script Ten Postscript	2969.00
Star LP8	1249.00

All laser printers include 1 year on site maintenance

FAX

Canonfax	
Fax80	623.00
Fax230	915.00
Fax410	1415.00
Nefax N2 (Special Price)	849.00
Nefax N3	1006.00
Panfax UF150	915.00
Panfax UF250	1265.00
Sanyofax 100	989.00
Sharp FO-80	849.00
Sharp FO-150	959.00
Sharp FO-210	1269.00

REPAIRS – Most Repair work undertaken. Please telephone us for competitive quotes.

ANOTHER BRANCH OPENING SHORTLY – Education, Government & PLC orders welcome

CEEFAX Guide

B B+ M

Software is currently transmitted for a period of one week. Files are available from Friday afternoons to the following Thursday evening, with the exception of the issues teachers' notes which, due to their topical nature, are available from the Wednesday morning to the following Tuesday evening during the week of transmission. The details are provisional only.

Aug 11 to 17

Bisness
A lively and addictive simulation of the world of the small business. Take the reins of your very own company – in debt to the bank with an ultimatum to pay, wheel and deal, hire and fire as you battle for survival.

B/Guide B/Rom M/Guide M/Rom Update Notes
This extensive toolkit adds 40 new utilities to your BBC Micro or Master. There are facilities for program compaction, transferring files from disc to tape and back, moving blocks of ram around memory, together with many more. These utilities may be loaded into sideways ram, or alternatively stored in a resident eprom that can also provide a password protection mechanism.

Dat-Inf Image
This extremely useful facility adds another three commands to your operating system. It solves the problem of recalling the latest version of a file by date stamping it when saved. Each version then contains its own unique identity. Since the package uses the internal clock it will only run on a Master.

Motion
This impressive graphics demonstration shows just how powerful the Acorn machines can be. Written partly in machine code and using pre-calculated sine tables for speed, it generates Lissajous patterns – as found on oscilloscopes – and vividly demonstrates the beauty in maths.

Expert
Aimed at youngsters learning their times tables, Expert is colourful and fun to use, giving a variety of responses to the answers. It comes from the June edition of *The Micro User* and makes a useful supplement to beginners maths tuition.

Aug 18 to 24

BTPrint BT/Text Menu
Obtain bingo tickets from your printer with this automatic ticket generator. Full documentation of the software, and compatibility with most common printers is provided in this easy to use package.

Sp1 Sp2 Sp3
Can you navigate the dungeon and avoid the dreaded smiffs? This old-style arcade classic will require all your skills of coordination if your guided robot is to survive.

BCopier
Improve your DFS with this handy utility from the September 1987 issue of *The Micro User*. Have you ever considered trying to copy one side of a disc to another side of a different disc on a double sided, single disc drive? Well, in DFS you can't do without this utility.

Aug 25 to 31

In/Text Inlay P/Data
Add that professional touch to your audio cassette collection with this inlay card printer. Facilities are there to design your own layout of up to 15 artists and tracks per side. A choice of two print styles and full documentation is provided. Any Epson compatible printer should allow use of this program.

Tunemak
Turn your micro into an extremely versatile and easy to use musical instrument. Tunemak facilitates the creation of tunes by enabling a musical score to be entered from the keyboard. Tunes can be loaded, saved, viewed or played. This program could be very useful for accompanying a musician during practice.

BikBrkr
Coordination and speed is the name of the game for Blockbreaker. Full colour graphics and smooth animation make this an exhilarating and addictive game. Blockbreaker comes from the April 1988 edition of *The Micro User*.

Sept 1 to 7

HeadTEX HeadM/C HeadBAS
This clever utility allows you to create your own sideways rom headers that may be attached to Basic or machine code programs. This enables you to create your own rom software in any language that can be referenced by the rom filing system. Full documentation is provided.

Eliza
Tell your micro things you would never tell anyone else with this artificial intelligence classic. Eliza simulates the role of a personal analyst and allows you to hold a conversation with your micro.

Dino
Have you the skill to keep Dino astride his Gobblosaurus? Guide Dino on his journey across prehistoric England. Dodge many dangers as you go, but be careful, you only have four lives. Dino comes from the March 1987 issue of *The Micro User*.

BONEX

12 Elder Way, Langley Business Park, Slough
Berkshire SL3 6EP
Telephone: 0753 49502 Fax: 0753 43812 Telex: 848132
DISTRIBUTORS OF ELECTRONIC COMPONENTS

Data Switches

Top quality data switch boxes with no internal wiring. All internal connections are by way of gold-plated fibre-glass printed-through-hole pcb's, ensuring long term maintenance free reliability. All pins are switched. Sturdy metal case with rubber feet, overall size 260 x 195 x 58mm high.

	1+	5+	10+
2 x 25	22.50	20.50	17.00
4 x 25	29.50	27.00	21.50
2 x 36	26.50	23.00	19.50
4 x 36	32.50	29.00	23.50

Connectors-D Type

Type	1+	25+	100+	500+
9-way Plug	.29	.25	.20	.16
15-way Plug	.38	.32	.26	.21
25-way Plug	.48	.44	.36	.27
37-way Plug	.78	.67	.54	.45
50-way Plug	1.04	.94	.84	.76
9-way Skt	.34	.31	.25	.21
15-way Skt	.44	.37	.31	.26
25-way Skt	.55	.49	.43	.36
37-way Skt	1.30	1.10	.90	.70
50-way Skt	1.69	1.45	1.15	.95

Also available I.D.C. Type 'D' Plugs/sockets Centronics Plugs/sockets.

I.B.M. PARALLEL PRINTER LEADS

2M	1+	5+	10+
	8.95	8.20	6.95

Plastic Hoods for Connectors

Type	1+	25+	100+	500+
9-way	.37	.31	.24	.19
15-way	.47	.40	.34	.26
25-way	.52	.46	.41	.34
37-way	.76	.65	.58	.53
50-way	.84	.70	.65	.56

RS232 Accessories

A comprehensive range of versatile and useful accessories and adaptors for all your RS232 requirements.

Gender Changers

Type	1+	5+	10+
M/M	4.20	3.75	3.45
F/F	4.20	3.75	3.45

Jumper Box
D-Type 25-way connectors, male one end, female the other, joined by a fibre-glass pcd with all pins connected to pads on the pcb. The 50mm insulated wire links provided are used to connect the pads together. The unit is housed in a snap-shut plastic box.

1	5	10's
4.95	4.45	4.00

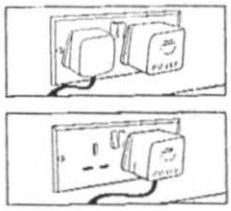
Mini Tester
Seven bi-colour LED's on lines 2, 3, 4, 5, 6, 8 and 20 light to indicate presence and polarity of signals. D-type 25-way connectors, male one end, female the other.

1	5	10's
8.25	7.45	6.25

Surge Protector
Varistor protection on lines 2, 3 and 7 from induced power surges, spikes etc. D-type 25-way connectors, male one end, female the other.

1	5	10's
10.25	9.45	8.25

SURGE PROTECTOR PLUG
Safely eliminates dangerous voltage surges/ spikes from domestic and professional appliances.



British made surge protector Plug available in red or white

1+	5+	10+
11.95	10.45	8.95

Full range of RS232 and Centronics Leads available

All Prices Include Delivery- Just add V.A.T. /15%

Obtain FREE software at any time with this teletext receiver

With the Morley Teletext Adapter you can download software whenever you like at no charge whatsoever. Programs are updated every week and range from educational and utility software to exciting games.

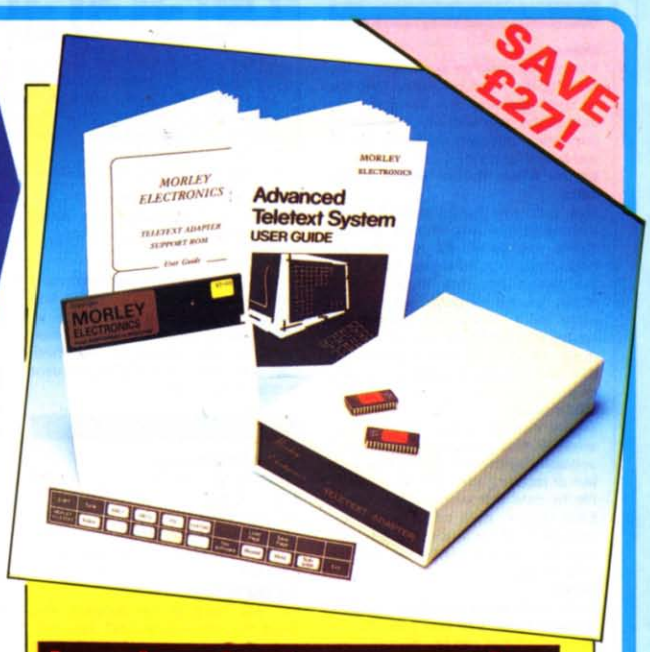
You'll also be joining the 3.5 million households who regularly access the thousands of pages on Ceefax, Oracle and 4-Tel to check programme details, football results, share prices, up-to-the-minute news bulletins and much more.

The Morley Teletext Adapter is the most popular unit on the market with more than 10,000 satisfied customers – including the Department of Transport who use it to display weather maps at service stations throughout the country. It plugs straight into the user port, includes menu-driven software and automatically tunes itself to the required channel.

You'll be able to store pages in memory, use the real-time clock in your programs and automatically load associated pages each time you select a page from the menu – considerably speeding up access time.

The Morley Teletext Adapter is an ideal companion for your BBC Micro system.

Note: If you use your BBC Micro's auxilliary power socket for your disc drive, or any other external device, you will need a power supply which we can provide for an additional £9.95.



Look what you get!

- Stylish beige teletext unit
- Official BBC Advanced Teletext rom
- Utilities disc packed with programs to help you make the most of your receiver

NORMAL PRICE £127

SPECIAL OFFER PRICE £99.95 *including VAT and p&p*

FREE!

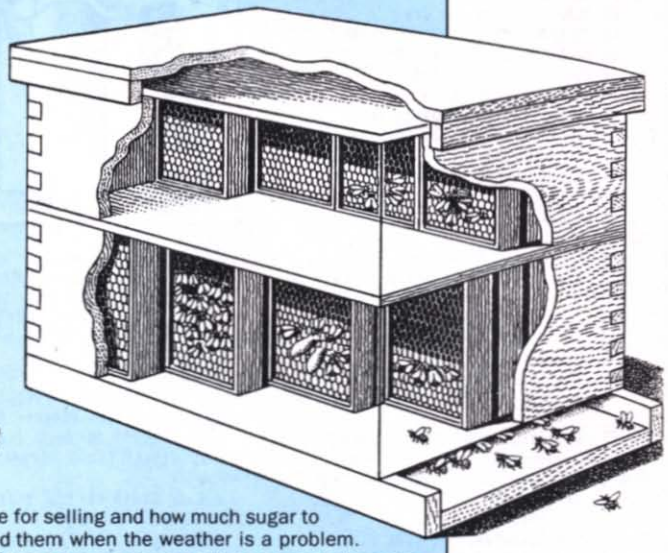
When you order a Morley Teletext Adapter you will also receive a FREE gift of Morley's Design 7 Plus Mode 7 editor, worth nearly £10.

IMPORTANT: The BBC points out that a teletext adapter, like a TV set, will not work satisfactorily without a good outside aerial. Nor will it function correctly if you experience reception problems such as ghosting. They emphasise that these problems only affect a few areas of the country. However if you have any doubts as to the quality of signal available in your area you should contact the BBC Technical Support Service during office hours on 01-927 5040.

To order please use the form on Page 119

B B+ M

Gimme the money, honey



Become a successful apiarist with Beehive, Rog Frost's fun educational program

KEEPING bees is an art that has remained unchanged for thousands of years. Now you can discover the fascinating details and difficulties of this ancient activity without risking a single sting. Aim of this simulation is simple: Keep a hive of bees alive and happy for four years and try to make a profit from the sale of honey.

In reality, bee keeping is a skilled and demanding occupation but for the program you only have to check the hive four times a year during spring, summer and autumn. You must then decide how much space to give your bees, how much honey to take for selling and how much sugar to feed them when the weather is a problem.

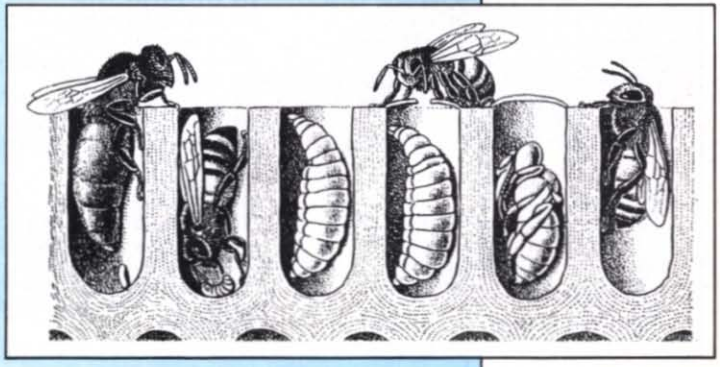
If there are too many workers or more than one queen the bees will swarm in groups of about 10,000. You can't stop them swarming, but it is possible to sell a nucleus – 10,000 workers plus a queen – for £10. It is important to kill extra queens if you don't have enough workers to sell off as a nucleus, otherwise they'll swarm and you'll lose them anyway.

Success at bee keeping depends on the weather, which plays its part in this program. Rainfall and temperature are generated randomly and good weather will be needed if the bees are to produce lots of honey.

Also you will not reap a large golden harvest if wasps raid the hive during the summer or mice take up residence in it during the winter. There's nothing you can do about this at all – but then, that's life.

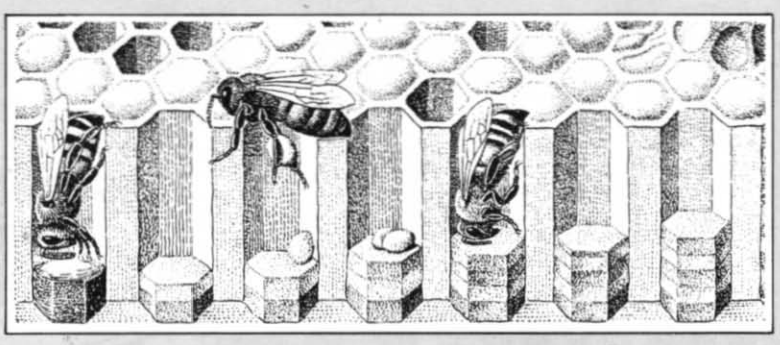
The program, which has full instructions, uses sensible variable names, so it should be easy to alter prices for honey or sugar. So just type it in, ensure you've made no errors using the checksums, and then find out whether you can have honey for tea.

Turn to Page 76 ▶



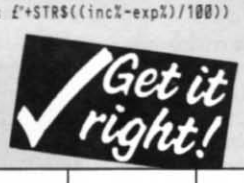
◀ From Page 75

```
10 REM Beehive Management Simulation
20 REM by Rog Frost
30 REM (c) The Micro User
40 ON ERROR MODE7:PROCerror:END
50 MODE4:VDU23;8202;0;0;0;
60 VDU19,0,4;0;19,1,3;0;
70 REPEAT PROCintro
80 PROCinstruct:PROCvariable
90 REPEAT S%=0:aid%=0:year%=year%+1
100 FOR month%=4 TO 10 STEP 2
110 PROCmonth:PROCweather
120 PROCproblems:PROCcalculate
130 IF queen%>0 IF FNlook PROCview:PRO
Cdecide
140 IF queen%>0 PROCupdate
150 PROCresults:IF queen%=0 month%=10
160 NEXT:UNTIL queen%=0:MODE7:END
170 DEFPROCintro:PROCwdw(1,TRUE)
180 PROCdh("HIVE",17,1)
190 PROCwdw(2,TRUE)
200 PROCtab(2,2,"You have bought a hiv
e of bees costing £200. This consists of
:")
210 PROCtab(3,VPOS+2,"One brood box >O
ne super >One spare super with frames >2
0,000 bees >One queen >Essential gear (.
moker, veil etc)")
220 PROCcont:ENDPROC
230 DEFPROCwdw(W%,C%):LOCAL F%,B%
240 IF W%=1 VDU28,0,5,39,0:B%=1
250 IF W%=2 VDU28,0,26,39,6:F%=1
260 IF W%=3 VDU28,0,31,39,27:B%=1
270 COLOURF%:COLOURB%+128:IF C% CLS
280 ENDPROC
290 DEFPROCcont
300 PROCwdw(3,TRUE):*FX21
310 PROCtab(2,2,"Press the space bar t
o continue")
320 REPEATUNTILGET=32
330 PROCwdw(3,TRUE):ENDPROC
340 DEFPROCinstruct
350 PROCwdw(2,TRUE)
360 PROCtab(3,1,"Your aim is to keep y
our hive of bees alive and happy while t
rying to make a profit.")
370 PROCtab(3,VPOS+1,"Your hive consis
ts of a brood box in which the queen liv
es and the bees are reared. On this you
can put one or two top floors (SUPERS).
These may get filled with honey.")
380 PROCtab(3,VPOS+1,"Spare supers sho
uld be removed for the winter or the bee
s will die from cold.")
390 PROCcont:PROCwdw(2,TRUE)
400 PROCtab(3,1,"Honey sells for £2.86
/kg. >Sugar is bought for 45p per kg.")
410 PROCtab(3,VPOS+1,"You may sell a n
ucleus of 1 queen with 10,000 bees for £
10. Each super (maximum 2) can hold 22kg
s of honey. Adding a super will cost you
 £5 for wax foundation.")
420 PROCtab(3,VPOS+1,"Natural disaster
s like nesting mice and marauding wasps
can add to your problems.")
430 PROCtab(3,VPOS+1,"Beyond that it's
up to you!")
440 PROCcont:ENDPROC
450 DEFPROCvariable
460 bee%=40000:queen%=1:exp%=20000
470 honey=20:sting%=0:inc%=0
480 super%=1:help%=0:sugar%=0
490 max_honey=22:honey_price=286
500 ENDPROC
510 DEFPROCmonth:PROCwdw(1,FALSE)
```



```
520 IF month%=4 month$="April "
530 IF month%=6 month$="June "
540 IF month%=8 month$="August "
550 IF month%=10 month$="October"
560 PROCtab(0,4,"12 "+month$+" Year "
+STR$year%)
570 ENDPROC
580 DEFPROCweather:PROCwdw(2,TRUE)
590 T%=RND(100):R%=RND(100)
600 IF T%<15 T$="COLD" ELSEIF T%<35 T$
="COOL" ELSEIF T%<70 T$="NORMAL" ELSE T$
="HOT"
610 IF R%<15 R$="LOW" ELSEIF R%<70 R$=
"NORMAL" ELSE R$="HIGH"
620 PROCtab(4,5,"The temperature is "+
T$+" for this time of year.")
630 PROCtab(4,8,"The rainfall is "+R$+
" for this time of year.")
640 PROCcont:ENDPROC
650 DEFPROCproblems
660 P%=RND(100):IF P%>15 ENDPROC
670 IF month%=4 PROCmice
680 IF month%=6 PROCswarm
690 IF month%=8 PROCwasp
700 ENDPROC
710 DEFPROCmice:PROCwdw(2,TRUE)
720 bee%=bee%*3/4:honey=honey*3/4
730 PROCtab(3,3,"Mice have nested in y
our hive with unfortunate effects on you
r bees and honey.")
740 ENDPROC
750 DEFPROCswarm:PROCwdw(2,TRUE)
760 PROCtab(3,3,"SWARM! 10,000 bees ha
ve gone!")
770 bee%=bee%-10000
780 IF queen%>1 queen%=queen%-1
790 ENDPROC
800 DEFPROCwasp:PROCwdw(2,TRUE)
810 PROCtab(3,3,"Wasps have attacked y
our hive. You have lost bees and honey."
)
820 bee%=bee%*9/10:honey=honey*3/4
830 ENDPROC
840 DEFPROCcalculate
850 IF month%=4 PROCapril
860 IF month%=6 PROCjune
870 IF queen%>0 IF bee%>60000 queen%=q
ueen%+RND(4)
880 IF month%=8 PROCaugust
890 IF month%=10 PROCoctober
900 IF honey>max_honey*super% honey=ma
x_honey*super%
910 sugar%=0:ENDPROC
920 DEF PROCapril
930 bee%=(bee%+(T%-R%-10)*10)/super%
940 honey=honey+((T%-80)/4+(40000/bee%
)/2+sugar%/3)/2.2
950 IF honey<0 PROCdisaster("Your bees
 have no honey. They have all died.")
960 ENDPROC
970 DEF PROCjune
980 bee%=bee%*4/3+(T%/30)+(80-R%)*20
990 honey=honey+T%+4*bee%/R%/25000+sug
ar%/4
1000 ENDPROC
1010 DEF PROCaugust
1020 bee%=bee%+(T%-R%+80)*40
1030 honey=honey+(T%/R%)+7*(bee%/25000)
+(sugar%/4)
1040 queen%=queen%+RND(2):ENDPROC
1050 DEF PROCoctober
1060 bee%=bee%+(T%-30)*30+(80-R%)*20
1070 honey=honey+bee%/8000+T%/R%+sugar%
/4
1080 ENDPROC
1090 DEFFNlook:PROCwdw(3,TRUE)
1100 PROCtab(4,1,"Do you want to look i
n the hive this month? (Y/N)")
1110 =CHR$(GETAND&DF)="Y"
1120 DEF PROCview:PROCwdw(2,TRUE)
1130 PROCtab(3,1,"A look at the hive sh
ows:")
1140 PROCtab(5,VPOS+1,STR$bee%+" bees >
"+STR$INThoney+" kg(s) of honey >"+STR$q
ueen%+" queen(s)")
1150 b%=RND(10):IF b%>6 b%=0
1160 s%=b%-help%:IF s%<0 s%=0
1170 S%=S%+s%:aid%=aid%+s%
1180 sting%=sting%+s%
1190 PROCtab(3,VPOS+1,"You get stung "+
STR$s%+" time(s). >That's "+STR$S%+" sti
ng(s) this year. >Total stings = "+STR$s
ting%)
1200 IF aid%>6 PROCcont:PROChelp
1210 PROCcont:ENDPROC
1220 DEFPROChelp:help%=help%+1
1230 PROCwdw(2,TRUE)
1240 PROCtab(3,4,"You have been stung t
oo many times this year. You get help fr
om Mr Porch the bee man. He charges £"+S
TR$(5*help%))
1250 exp%=exp%+500*help%
1260 aid%=0:ENDPROC
1270 DEFPROCdecide
1280 REPEAT PROCwdw(2,TRUE)
1290 PROCtab(3,4,"You have to make deci
sions now >H.....Take some honey >F.....
Feed with sugar >N.....Take a nucleus >S
.....Add a super >Q.....Destroy queens >
R.....Remove a super")
1300 PROCtab(3,VPOS+1,"Press the space
bar when you are finished")
1310 G%=GETAND&DF
1320 IF G%=72 PROChoney
1330 IF G%=70 PROCfeed
1340 IF G%=78 PROCnucleus
1350 IF G%=83 PROCsuper
1360 IF G%=81 PROCqueen
1370 IF G%=82 PROCremove
1380 UNTIL G%=0:ENDPROC
```

```
 1390 DEFPROChoney
 1400 REPEAT PROCwdw(2,TRUE)
 1410 PROCtab(3,1,"How much honey will y
ou take? (up to "+STR$INThoney+"kgs)")
 1420 INPUTTAB(4)">"H%:PROCwdw(3,TRUE)
 1430 IF H%>honey PROCtab(3,VPOS,"There
 isn't that much in the hive.")
 1440 IF H%<0 PROCtab(3,VPOS,"You can't
put honey into the hive.")
 1450 UNTIL H%<=honey AND H%>-1
 1460 honey=honey-H%
 1470 inc%=inc%+H%*honey_price
 1480 ENDPROC
 1490 DEFPROCfeed
 1500 REPEAT PROCwdw(2,TRUE)
 1510 PROCtab(3,1,"How much sugar will y
ou use (kg)?")
 1520 INPUTTAB(4)">"F%:PROCwdw(3,TRUE)
 1530 IF F%<0 PROCtab(3,VPOS,"You can't
take sugar out of the hive.")
 1540 UNTIL F%>0
 1550 exp%=exp%+F%*45:sugar%=F%:ENDPROC
 1560 DEFPROCnucleus:PROCwdw(3,TRUE)
 1570 IF queen%=1 PROCtab(3,1,"You only
have one queen!"):ENDPROC
 1580 PROCtab(3,1,"You have sold 10,000
bees and one queen for £10")
 1590 bee%=bee%-10000:queen%=queen%-1
 1600 inc%=inc%+1000:ENDPROC
 1610 DEFPROCsuper:PROCwdw(3,TRUE)
 1620 IF super%=2 PROCtab(3,1,"You've go
t it on already!"):ENDPROC
 1630 PROCtab(3,1,"You have added a supe
r. >The wax foundation costs you £5")
 1640 super%=2:exp%=exp%+500:ENDPROC
 1650 DEFPROCqueen:PROCwdw(3,TRUE)
 1660 IF queen%=1 PROCtab(3,1,"You only
have one queen."):ENDPROC
 1670 REPEAT PROCwdw(2,TRUE)
 1680 PROCtab(3,1,"How many queens do yo
u wish to destroy (up to "+STR$(queen%-1
)+")")
 1690 INPUTTAB(4)">"Q%:PROCwdw(3,TRUE)
 1700 IF Q%>queen%-1 PROCtab(3,VPOS,"Tha
t's too many.")
 1710 IF Q%<0 PROCtab(3,VPOS,"You can't
put queens into the hive.")
 1720 UNTIL Q%<=queen%-1 AND Q%>-1
 1730 queen%=queen%-Q%:ENDPROC
 1740 DEFPROCremove:PROCwdw(3,TRUE)
 1750 IF super%=1 PROCtab(3,1,"You only
have one on!"):ENDPROC
 1760 PROCtab(3,1,"You have removed a su
per.")
 1770 super%=1:ENDPROC
 1780 DEFPROCupdate:REPEAT
 1790 IF bee%>60000 OR queen%>1 PROCswar
m:PROCcont
 1800 UNTIL bee%<60000 AND queen%<2
 1810 ENDPROC
 1820 DEFPROCresults:PROCwdw(2,TRUE)
 1830 PROCtab(2,1,"Your situation is: >
> >"+STR$bee%+" bees >"+STR$queen%+" que
en(s) and >"+STR$super%+" super(s) on yo
ur hive")
 1840 @%=&02020A
 1850 PROCtab(3,VPOS+2,"Total income is
£"+STR$(inc%/100)+" > >Total expenditure
 has been £"+STR$(exp%/100))
 1860 @%=0
 1870 PROCtab(3,VPOS+2,"You have "+STR$I
NThoney+"kgs of honey and "+STR$sugar%+"
 kg of sugar in your hive")
 1880 IF queen%>0 IF bee%>10000 PROCcont
:ENDPROC
 1890 IF queen%=0 m$="You have no queen.
 Your colony is destroyed."
 1900 IF honey+sugar%<1 m$="Your bees ha
ve no food. They have all starved."
 1910 IF bee%<10000 m$="Your colony is t
oo small to survive. All of your bees ha
ve died."
 1920 PROCdisaster(m$):ENDPROC
 1930 DEFPROCdisaster(m$)
 1940 PROCwdw(2,TRUE):PROCtab(3,1,m$)
 1950 PROCtab(3,VPOS+1,"You have killed
off your hive! Try keeping rabbits!")
 1960 queen%=0:bee%=0:honey=0:sugar%=0
 1970 PROCcont:ENDPROC
 1980 DEFPROCsuccess:PROCwdw(2,TRUE)
 1990 PROCtab(3,3,"You have kept bees fo
r four years -- perhaps you should try a
 real hive.")
 2000 PROCcont:PROCtable:ENDPROC
 2010 DEFPROCtable:PROCwdw(2,TRUE)
 2020 PROCtab(3,VPOS+1,"You have: >"+STR
$bee%+" bees >"+STR$queen%+" queen(s), a
nd >"+STR$INThoney+" kgs of honey >in yo
ur hive.")
 2030 PROCtab(3,VPOS+1,"You have been st
ung "+STR$sting%+" time(s)")
 2040 @%=&2020A
 2050 PROCtab(3,VPOS+1,"Your expenditure
 has been £"+STR$(exp%/100)+" >Your inco
me has been £"+STR$(inc%/100)+" >Your pr
ofit is £"+STR$((inc%-exp%)/100))
 2060 ENDPROC
 2070 DEFPROCcheat
 2080 PROCwdw(2,TRUE):exp%=exp%+5000
 2090 PROCtab(3,VPOS+1,"You have kept be
es for four years but have left them to
starve in the coming winter. Your cruelt
y has led to a £50 fine.")
 2100 PROCcont:PROCtable:ENDPROC
 2110 DEFPROCdh(V$,B%,C%)
 2120 LOCALX%,Y%:b=&72:A%=&A:X%=&72
 2130 FOR D%=1 TO LENV$
 2140 ?b=ASCMID$(V$,D%):CALL&FFF1
 2150 VDU23,250,b?1,b?1,b?2,b?2,b?3,b?3,
b?4,b?4
 2160 VDU23,251,b?5,b?5,b?6,b?6,b?7,b?7,
b?8,b?8
 2170 VDU31B%-1+D%C%250,8,10,251,11
 2180 NEXT:ENDPROC
 2190 DEFPROCerror
 2200 ON ERROR OFF:REPORT
 2210 PRINT" at line ";ERL
 2220 @%=10:ENDPROC
 2230 DEFPROCtab(X%,Y%,t$):VDU31,@,Y%
 2240 LOCAL x%,z%,w$:x%=X%:z%=40-X%
 2250 REPEAT PROCw:c$=LEFT$(w$,1)
 2260 IF c$=">" PRINT:x%=X%:w$=MID$(w$,2
)
 2270 IF c$="!" x%=EVALMID$(w$,2):w$=""
 2280 IF (x%+LENw$)>z% PRINT:x%=X%
 2290 PRINTTAB(x%)w$;:x%=POS
 2300 UNTIL t$="":PRINT:ENDPROC
 2310 DEFPROCw:LOCAL P%
 2320 P%=INSTR(t$," "):IF P%=0 P%=254
 2330 w$=LEFT$(t$,P%):t$=MID$(t$,P%+1)
 2340 ENDPROC
```




```
 10 =     0 0    400 = DE4E F    790 = ED0F 3   1180 = DFB8 4   1570 = 6040 F   1960 = C8D8 7
 20 =     0 0    410 = FB46 C    800 = 3CBB C   1190 = 1491 C   1580 = F90B 6   1970 = 5AB7 3
 30 =     0 0    420 = 46CA 8    810 = 4D92 D   1200 = 57AC A   1590 = DFD0 F   1980 = 7426 2
 40 = B0C1 1     430 = CBAA 2    820 = E871 6   1210 = 5AB7 5   1600 = 8218 D   1990 =  175 0
 50 = BA2D C     440 = 5AB7 3    830 = ED0F 4   1220 = FFD0 5   1610 = F450 2   2000 = BC9F C
 60 = 51E2 8     450 = B464 9    840 = 458A F   1230 = 737A 4   1620 = D8F8 0   2010 = 390E 5
 70 = CCAB 0     460 = C9AE 7    850 =  98C 5   1240 = C455 6   1630 = 6056 1   2020 = 4B15 2
 80 = 9ECF 6     470 = F11B 4    860 = 7256 5   1250 = B3A6 B   1640 = 5525 5   2030 = 5A6C 3
 90 = B5D1 9     480 = DC75 F    870 = 204E B   1260 = F77C F   1650 = 4907 E   2040 = F550 D
100 = 2B14 4     490 = 1F5F 2    880 = 37D0 A   1270 = 70D1 C   1660 =  5B9 4   2050 = E66B E
110 = 3ED2 7     500 = ED0F 4    890 = A305 2   1280 = F141 B   1670 = F141 0   2060 = ED0F 7
120 = 2AE8 3     510 = 60DA 2    900 = 285C 5   1290 = 1726 4   1680 = CFCA C   2070 = EC14 D
130 = 2BF2 E     520 = 5C98 6    910 = C126 0   1300 = 3E68 A   1690 = E1E6 7   2080 = 47CB E
140 = A700 4     530 = B831 0    920 = 4F83 2   1310 = 4E31 7   1700 = 5D26 5   2090 = 556D A
150 = 49E0 8     540 = BF44 0    930 = 1BAB A   1320 = 9AA0 5   1710 = A9D9 1   2100 = BC9F D
160 = 9500 6     550 = C0D7 C    940 = 6646 7   1330 = 1A2D F   1720 = 3982 9   2110 = ACFD 9
170 = D91A 3     560 = A92D E    950 = E128 F   1340 = B6FF 8   1730 = 9121 8   2120 = CCA8 4
180 = 5CA1 A     570 = ED0F 8    960 = ED0F 2   1350 = 3787 8   1740 =  6CF 1   2130 = 8548 3
190 = 737A C     580 = 403F A    970 = F31E 5   1360 = 878C 4   1750 = 9C62 0   2140 = AF9B 3
200 = CACB 0     590 = 7405 D    980 = 766C E   1370 = 7E4A D   1760 = 1C91 7   2150 = DAD0 F
210 = 5220 5     600 = 6511 6    990 =  B34 3   1380 = 2B36 F   1770 = CD7C 7   2160 = 55D0 D
220 = 5AB7 1     610 = CAC0 F   1000 = ED0F 8   1390 = BC5E 2   1780 = 6391 C   2170 = 9EFD 4
230 = E531 A     620 = 5D89 8   1010 = A5C2 1   1400 = F141 6   1790 = 8AAE 5   2180 = E531 E
240 = DCBF 4     630 = A286 3   1020 = 5AD3 7   1410 = A3A7 2   1800 = DAAA 9   2190 = D7A7 C
250 = D651 E     640 = 5AB7 C   1030 =  18E D   1420 = CE6B 3   1810 = ED0F A   2200 = F2E7 0
260 = FA6F 3     650 = 9EBE 0   1040 = 927A 5   1430 = DB43 D   1820 = 82A6 3   2210 = F321 0
270 =  B08 1     660 = 2B95 A   1050 =  1E2 D   1440 = F7C4 1   1830 = 65E9 F   2220 = 1ED8 9
280 = ED0F D     670 =  3C6 6   1060 = 41FB 8   1450 = 4C5C 1   1840 = C0FC 2   2230 = 5056 C
290 = F240 1     680 = 4245 5   1070 = A417 2   1460 = B50E 8   1850 = A65E 1   2240 = AFB3 3
300 = A36A C     690 = CAE7 C   1080 = ED0F A   1470 = F04F B   1860 = 4630 8   2250 = 54AD E
310 = CA5C 6     700 = ED0F F   1090 = 728C 2   1480 = ED0F A   1870 = 3A8A C   2260 =  21A 4
320 = 5B81 0     710 =  7DC D   1100 = E679 F   1490 = 470F C   1880 = CEF8 B   2270 = E1FD C
330 = C026 2     720 = BB96 E   1110 = D361 2   1500 = F141 8   1890 = 2D4B D   2280 = 5EB6 2
340 = EEDD B     730 = DEFF 8   1120 = C310 C   1510 = 9C0B 9   1900 =  6CA 9   2290 = B194 2
350 = 737A 7     740 = ED0F B   1130 = 36B2 0   1520 = DEFD 3   1910 = E6F9 4   2300 = B5BD C
360 = 1048 6     750 = C6E4 4   1140 = FBE7 8   1530 = EE3E C   1920 = BF6A 0   2310 = F898 0
370 = 35FB 0     760 = 39C4 A   1150 = 9220 A   1540 = E3B1 0   1930 = B2FB 4   2320 = 3A0A 3
380 = 29F7 A     770 = 869D D   1160 = FE95 5   1550 = 58E7 3   1940 = F7E3 9   2330 = D31C C
390 = 6EE6 A     780 = 78F4 C   1170 = A022 A   1560 = 58BA A   1950 = 82C0 F   2340 = ED0F 8
```

WHO BETTER TO DEMONSTRATE THE PERFECT PAINTER

Leonardo Da Vinci, hailed as the perfect painter. Creating priceless masterpieces with oil, canvas, pen and ink that are marvelled at in galleries world wide.

Leonardo Da Vinci (1452 – 1519)

Self Portrait c.1513 drawn in Pro-Artisan c.1989

What marvels then, could he have created with modern tools within his grasp?

Like Pro-Artisan from Clares. A computer graphics and image manipulation package which, combined with the Archimedes, produces breathtaking graphics. Bending, shaping, colouring and toning to your every whim.

Eye Detail

Mag × 2 in zoom mode

Mag × 4 illustrating pixelisation

A modern day paintbox.

With which (it may be fair to assume) his self portrait may have looked like the image above, and with Pro-Artisan's zoom facility, he could have created even greater detail.

Da Vinci was indeed a genius.

Ahead of his time. A latterday Einstein. Creating wild and wonderful inventions like machines that fly, elaborate ships and submarines.

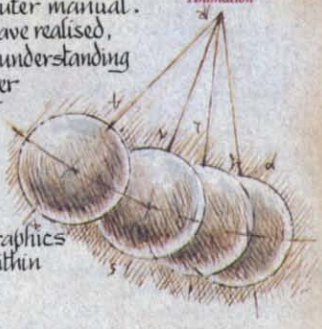
Light and shadow theory c.1492

Even more mind boggling is his analysis of optical principles. Ray tracing, for example, his understanding of shadow and light (the effect of light moving three dimensional objects) reads like a computer manual.

He will not have realised, but he had all the understanding of modern computer graphics, without the technology to put it into practice — what frustration.

Today, such graphics manipulation is within everyone's grasp.

Detail of Delta Animation



Newton's cradle

Screen detail of Render Bender

With Render Bender from Clares which, using ray tracing, allows the production of 3D scenes and objects. And then allows them to be animated, every shadow and reflection is perfectly calculated, appearing as it would in real life.

A computer generated movie, inside your own machine. Even better, your own soundtrack can be added.

What's more, interaction is now possible between Pro-Artisan, Render Bender and Armadeus.

A superb package, but spare a thought for poor Leonardo, if only he had then, what we have now.

RISC OS COMPATIBLE

Pro-Artisan – £169.95 inc. vat.

CLARES
MICRO SUPPLIES

98 Middlewich Road, Rudheath, Northwich, CHESHIRE CW9 7DA.
Telephone: 0606 48511 Fax No: 0606 48512

Render Bender – £79.95 inc. vat.

COLOURJET 132

HIGH PERFORMANCE COLOUR INK JET PRINTER

(compatible with IBM pc, BBC micro, Nimbus etc.)

- ★ PRINTS ALL 64 SCREEN COLOURS FROM CGA AND EGA USING OPTIONAL INTEGREX SOFTWARE
- ★ EMULATES OTHER PRINTERS (A1210, PJ1080A and QUADJET)
- ★ OVERHEAD TRANSPARENCY PRINTING
- ★ 80 + 132 COLUMN OPERATION, A4 WIDTH
- ★ UP TO 1280 DOTS/LINE ADDRESSABLE
- ★ FULL VIDEOTEX CAPABILITY
- ★ OPTIONAL BUFFERED RS232 (INTERNAL)
- ★ HIGHLY VERSATILE

ULTRA LOW NOISE

LIST PRICE £589 + VAT

EDUCATIONAL DISCOUNTS AVAILABLE

INTEGREX LTD CHURCH GRESLEY, BURTON ON TRENT
STAFFS DE11 9PT
Tel (0283) 215432
Telex 341727 INTEGX

HMSO PUBLIC SECTOR CUSTOMERS: FOR SPECIAL PRICING CALL 0603 695051

Z88 AND PSION ORGANISER

from

TK COMPUTERWARE

The mail order specialists

Z88

Z88 COMPUTER	£227	CENTRONICS I/F	£29
CARRY CASE	£10	MAINS ADAPTOR	£10
BBC LINK	£25	128K EPROM PACK	£50
32K RAM PACK	£20	Z88 COMPUTING	£10
128K RAM PACK	£50	USING YOUR Z88 BK	£10
512K RAM PACK	£200	SPELLMASTER	£59

WORDMONGERS SOFTWARE

ZBASE Z-88 → OFFBASE DATABASE FOR Z88

Designed for both first time users and experienced dBase programmers, zBase, with its Front End provides full relational database facilities on the Z88. **£69**

"zBase does indeed provide a passable near dBase environment on a portable computer..."

U.K. dBase User Group News

Z-TERM → Z88 TERMINAL PACKAGE

Scrolling and Viewdata modes. Compatible with Hayes, Miracle and dumb modems. Autodial with programmable function keys. **£52.50**

Z-TAPE → Z88 CASSETTE INTERFACE

Integrated package of software and cabling to use cassette recorder as file storage for the Z88. Includes catalogue tape, Save, Fetch and Verify. Also option to run machine program from RAM. Z-Tape menu follows the pattern of []F, Filer. **£52.50**

PSION ORGANISER

ORGANISER XP2	£139	SPREADSHEET	£40
COMMS LINK	£60	SPELL CHECKER	£30
32K DATAPACK	£35	DATA ORGANISER	£35
64K DATAPACK	£60	FINGER ORGANISER	£35
128K DATAPACK	£100	ORGANISER BOOK	£10
32K DRAM	£55	PSION PRINTER	£195

for further details contact:-

TK Computerware, Stone Street, North Stanford,
Ashford, Kent, TN25 6DF
Tel: 0303 812801 • Int: 010 44303 812801
Fax: 0303 812892 • Telex: 96676 PMFAB G
All prices include U.K. mainland delivery

ACCESS VISA AMERICAN EXPRESS MasterCard

CARE ELECTRONICS

800 St. Albans Road, Garston, Watford, Herts. WD2 6NL. Tel: 0923 672102

For your convenience first price Ex VAT, Second Inc VAT

NEW HEAT TRANSFER RIBBONS

Print onto ordinary paper and then onto a T-shirt.. Phone for details

CARE MASTER SMART CARTRIDGE

At the press of a button halt any program running and execute any one of a host of useful built in, or user defined functions and once completed will return to the program and continue. Built in functions include:- Tape to Disc, Screen Dump to Disc or Printer, Sound On/Off, Autosave and much more £30.00 £34.50c

CARE MASTER ROM CARTRIDGES

Designed by Care Electronics to Acorn specifications to enable the use of 2nd generation ROM. i.e. Interword/Spellmaster etc.

The Care Master cartridges offer 5 options for maximum user flexibility.

1. Dual cartridge takes 2 Rom £9.00 £10.35c
2. Single Zif takes 2 Rom £14.00 £16.10c
3. Dual Zif takes 2 Rom £18.00 £20.70c
4. 32k Switchboard Cartridge for 32K Roms £12.00 £13.80c
5. Quad Cartridge takes 4 Rom and enables by switching the use of any 2 roms inc Inter Series rom £12.00 £13.80c

BBC B ROM CARTRIDGE SYSTEM

BBC B Low Profile Rom System £13.00 £14.95c
BBC B Spare Cartridges £3.00 £3.45c
BBC B Cartridge Storage Rack £1.20 £1.38c

EPROM PROGRAMMER V2

Programs 8K, 16K, 32K CMOS or NMOS devices voltage selectable 21V or 12.5V. Complete with comprehensive software which includes Rom management system, plugs into the user port £30.00 £34.50d
Eprom Programmer Utilities Disc £6.00 £6.90c

SPECIAL OFFER

MORLEY TELETEXT ADAPTOR

Comes complete with 16K ATS Rom, Manual and utilities Disc at the unbeatable price of £86.00 £98.90b

LABELMASTER

INCLUDES MAILING LIST FACILITY

Uses a variety of print styles and sizes. All formatting is done for you and can accept different label sizes. A comprehensive label printing program that is easy to use for BBC B, Master, Compact and Electron–Please state model when ordering £16.00 £18.40c

CARE PRINTER BUFFER

User definable for BBC B, Master on Rom or Disc . £13.00 £14.95c

PRINTER SWITCHERS

Two computers to one printer or vice versa £25.00 £28.75b
Three computers to one printer or vice versa £33.00 £37.95b
Four computers to one printer or vice versa £40.00 £46.00b

Please note that the above units switch all lines, are suitable for all types of printers and computers using Centronics Parallel and INCLUDE LEAD

Six computers to one printer £60.00 £69.00b
Four to one automatic switcher £102.00 £117.30b
Eight to one automatic switcher £128.00 £147.20b

For advice or a quote on your installation please phone

User port switcher 2 to 1 & off £25.00 £28.75d

CARE READY MADE LEADS RANGE

BBC/Master RGB-Euro (Scart) £9.00 £10.35c
BBC/Master RGB-7 Pin Hitachi £7.00 £8.20c
BBC/Master RGB-7 Pin Ferguson £7.00 £8.20c
Centronics to Centronics Printer £11.00 £12.65c
User Port Extension lead 0.5M £9.00 £10.35c
1MHz Bus Extension lead 0.3M £10.40 £11.96c

Wide range of leads in stock–please phone

Government & Educational orders welcome. How to Order: Enclose your cheque or P/Order made payable to CARE ELECTRONICS. Access or Visa cards welcome Please allow 7 days for delivery.
Please add Post & Packing – a=£11.50; b=£3.45; c=£1.38; d=£2.30
We will be closed for the month of August 1989

Tastier Menus

Produce better programs faster with Ali Harwood's user interface system

HAVE you ever wanted to add a little more sophistication to your programs by including a menu or two, but found that making them user-friendly involves a lot of programming? Well, these programs do all the hard work for you. Listing I is a menu designer. You enter the menu details and it outputs a few lines of data. Listing II is a stand-alone menu program which takes the data output from the designer, displays the menu and waits for you to select your option using the inital letter or the cursor keys.

To enter your own menu, run Listing I and key in the number of menu items – up to 15 – followed by the menu heading and items. Along the bottom of the screen, using the four cursor keys you can select and change the colour of either border, heading, text ot highlight bar. When you have finished press Escape.

You are asked to enter a line number. This is the start of the menu data. There may be more than one line output, with line numbers increasing by one each time. The data lines are stored in an Ascii file under the filename entered and can be added to your program using:

```
*EXEC <filname>
```

Add the lines 100 to 300 of Listing II to your own program. The rest is only a demonstration to show the program's capabilities. Every time you need the menu, restore the data pointer to the relevant start line with:

```
RESTORE <line number>
```

Then use:

```
option$=FNmenu
```

You should be in Mode 7. After selection the variable *option$* will contain the initial character of the selected item. You can then use a set of IF ... THENs to select the route requested by the user.

And that's it, quick menus for easy programming.

Program I

```
  10 REM Quick Menus Designer
  20 REM by Ali Harwood
  30 REM (c) Micro User
  40 :
  50 MODE7
  60 PROCinit
  70 PROCdetails
  80 PROCshow
  90 PROCcolours
 100 PROCsave
 110 END
 120 :
 130 DEFPROCinit:*FX4,1
 140 DIMitem$(15),c%(3),x%(3):*FX229,1
 150 FOR A=0 TO 3:READc%(A),x%(A):NEXT
 160 ENDPROC
 170 :
 180 DATA 2,2,2,14,2,26,1,35
 190 :
 200 DEFPROCcursor(c)
 210 VDU23;10,255-159*c;0;0;0
 220 ENDPROC
```

Turn to Page 121 ▶

Write your own arcade smashes using the

ARCADE GAME Creator

Arcade Game Creator is a suite of programs for the Electron and BBC Micros. Taken from the pages of *Electron User*, it lets you into the secrets of writing fast-action arcade games, and provides you with a number of utilities to make design and programming easier.

Among the programs are:

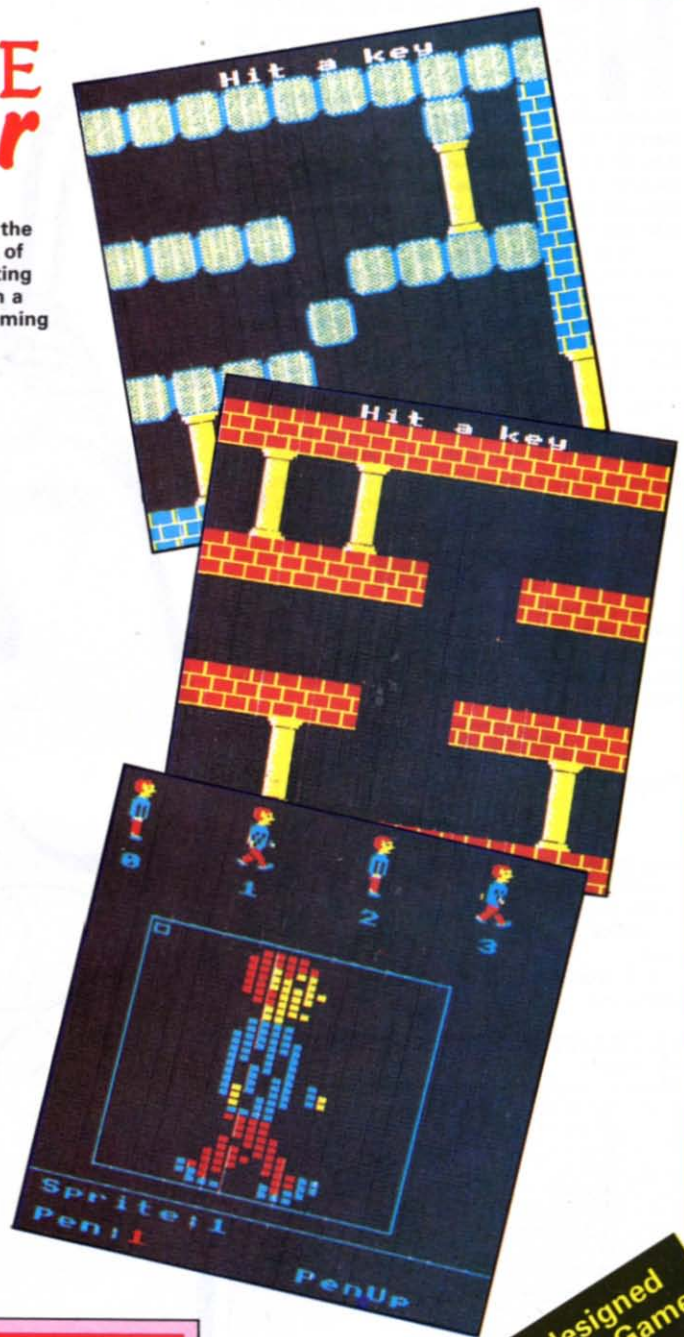
- A Mode 5 sprite editor that lets you design your own multi-coloured characters.
- A selection of fast print routines that will move sprites both in front or behind other objects on the screen.
- Map generators that will squeeze a Mode 5 screen into 8 bytes!
- Scrolling maps.
- Score update and printing routines.

. . . and much, much more.

To help you make the most of the Arcade Game Creator, you will also get a comprehensive manual based on the original series.

Written in an easy to read style and with many illustrations and screen shots, it contains all the information you need to create and animate sprites, to design backgrounds and to link the two together into a complete arcade game.

If you are an aspiring games programmer, this is an offer you simply cannot afford to miss!



Screens designed using Arcade Game Creator

Arcade Game Creator	
Tape + manual	£9.95
Disc + manual	£11.95

To order please use the form on Page 119

Following the success of the *Spring Open Day* (when some 1100 people attended) by popular demand **Acorn's Biggest Dealer** and a leading magazine for ALL Acorn Users

Presents .....

Autumn Hands On Open Day

at **WATFORD ELECTRONICS**
Jessa House, 250, Lower High Street, WATFORD
(Tel: 0923 - 37774)
on Sunday 8th October 1989
10.00am - 4.00pm

Watford Electronic's Technical and Sales personnel will be on hand to discuss all your technical queries and computer requirements.

Also appearing:

ACORN - technical staff to answer your questions on the whole Acorn range of computers including the A3000.

COLTON SOFTWARE - *to demonstrate the world beating* ***View Professional*** *and* ***Pipedream 3 package.***

COMPUTER CONCEPTS - to demonstrate the sophisticated ***'Impression'*** package and the ***Scan Light Scanner.***

MINERVA SOFTWARE - to demonstrate the power of the System Delta Plus Database and the Atelier Art package.

BBC ACORN USER - staff and contributors to answer your questions, give advise and demonstrate some of the best programs appearing every month in the BBC Acorn User magazine

MAKE SURE YOU ATTEND THE KEY AUTUMN EVENT IN THE *ACORN* CALENDAR.

Refreshments will be served.

Watford Electronics : BBC Acorn User : Acorn - The *BIGGEST and the BEST*

Watford Electronics

Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774 Tlx: 8956095 Fax: 01 950 8989

Acorn
The choice of Experience

Shop House: 9am to 6pm (Mon.-Sat.) Thursday 9am to 8pm. FREE customer car park.

All prices exclusive of VAT; subject to change without notice & available on request.

Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

The choice before and after the experience

Archimedes micro

Now supplied with the New RISC OS

System	Basic	Mono	Colour	Multiscan
305	£725	£785	£924	£1144
310	£899	£959	£1098	£1318
310M	£959	£1019	£1158	£1379
410/1	£1144	£1259	£1398	£1619
420/1	£1699	£1759	£1898	£2119
440	£2499	£2559	£2698	£2919

(Securicor carr. £10 on Archimedes)

Archimedes A3000

A RISC worth taking

- A3000 Archimedes Micro £649
- A3000 IBM RAM Upgrade £159
- A3000 Watford 4MB RAM Upgrade £TBA
- A3000 3.5" External Drive £TBA
- A3000 User Port/MIDI Upgrade £49
- A3000 Serial Upgrade £19
- A3000 Monitor Stand £29
- A3000 Twin Monitor Stand £TBA
- Hard Disc Podule only £TBA
- A3000 20 Meg Hard Disc, 40mS External complete with Podule £399
- A3000 40 Meg Hard Disc, 20mS External complete with Podule £439

0% FINANCE

We are once again able to offer 0% finance for the purchase of an Archimedes Micro. For further details please write in or telephone 0923 37774 ext 203.

SPECIAL OFFER

Buy an Archimedes micro from us at above prices and we will conbtribute 10% of the money you spend, towards the purchase of a printer, disc drive or any Hardware or Software of your choice.

ACCESSORIES

- NEW Multitasking RISC OS £29
- 0.5 Mb RAM for 305 £110
- 1MB RAM Upgrade for 400/1 £149
- Watford 2 MB RAM Upgrade £TBA
- Watford 4 MB RAM Upgrade £TBA
- ROM Podule Acorn £56
- ROM Podule (Computer Concepts) £45
- ROM Podule (C C) with Battery Backup £59
- 2 Podule Backplane + Fan (Acorn) £37
- 2 Podule Backplane (Watford) £25
- 4 Podule Backplane (Watford) £38
- Backplane FAN only (for Hard Disc) £9
- 3.5" 800K 2nd Floppy Drive (305/310) £118
- 5.25" 800K external Floppy Drive (305/310) £105
- I/O Podule (with Analogue port, User port, & 1MHz bus) £80
- MIDI add-on to I/O Podule £37
- MIDI Expansion Card £65
- Sound Sampler Mono (Armadillo) £129
- Sound Sampler Stereo (Armadillo) £166
- Sound Sampler Stereo/Midi (Armadillo) £186
- Chromalock Podule £280
- 20 Mb Hard Disc & Controller Card £469
- Watford's latest 20 Megabyte Hard Disc, Controller Card & Utilities Software £379
- Econet Network Board £49
- Archimedes IEEE Interface Adaptor £269
- Dual RS232 Podule £195
- 16 bit parallel I/O Card £195
- NEW – Archi MK II Replacement Mouse £39
- PC Emulation Pack incl. MSDOS 3.21 £52
- Archimedes Reference Manual £29
- Arm Assembly Lang. Prog. Manual £15
- Archimedes BBC Basic Guide £20

By popular demand, we are now supplying refurbished and fully guaranteed BBC Micros with Disc Filing System
(Please telephone for price & availability)

Acorn's Archimedes DeskTop Publishing Package £125

GRAPHICS, ART, DESIGN & GAMES

Artisan	£31	Gamma Plus	£60
Pro Artisan	£140	Graphic Writer	£23
Support Disc	£16	Autosketch	£69
Toolkit (Beebug)	£32	Toolkit (Clares)	£31
Arc Termulator	£56	Zarch	£16
Alerian	£12	Conquerer	£20
Minotaur	£11	Missile Control	£13
Kermit	£46	Enthar Seven	£29
Archeffect	£20	Archeffect	£20
ArcTFS	£25	Lingenuity Presenter	£24
Render Bender	£66		

MINERVA's Archimedes Software

Sigmasheet	£57	Gammaplot	£57
Deltabase	£24	System Delta+	£69
System Delta + Reference Manual			£25
Home Accounts*	£42	Sales Ledger*	£53
Stock Manager*	£53	Purchase Ledger*	£53
Nominal Ledger*	£53	Reporter	£20
Ancestry	£59	Mailshot	£33
Order Processing/Invoicing*			£53
School Administrator			£66

Requires System Delta

WORDPROCESSORS

Wordwise +	£18	Pipedream	£89
Image Writer	£25	P. Spellchecker	£40
Interword ROM	£35	View	£49
1st Word Plus	£75	Viewspell	£32
Archie Spell Master	£39	ViewIndex	£12

DATABASES

AlphaBase	£39	Flying Start II	£80
Viewstore	£49	System's Delta+	£60

SPREADSHEETS

Intersheet ROM	£35	Viewsheet	£49
Sigmasheet			£59

BUSINESS GRAPHICS

GammaPlot	£59	Interchart ROM	£25

INTEGRATED PACKAGES

Logistix – Database, Spreadsheet, Time Management & Business Graphics £94
Pipedream 3 – Wordprocessor, Database & Spreadsheet £TBA

Archimedes to BBC SERIAL LINK

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

Only £15

CREDIT TERMS now available.
In these days of expensive borrowing, we have negotiated a special deal for our customers, which allows us to offer you, low cost finance scheme at 12.25% per annum, typical APR 25.5%. For further details please telephone or write in.

Archimedes 5¼"/3½" Disc drive Interface

With this interface it is possible to connect almost any 5¼"/3½" disc drive with its own power supply to the Archimedes. NO SOLDERING is involved. Supplied complete with necessary lead.

Only £21

Watford's 20Meg & 40Meg Archimedes Hard Disc

Watford Electronics' 20Meg & 40Meg hard disc fits internally into the Winchester slot provided. It is fully compatible with Acorn's hard disc upgrade, (the only difference is our low price). Price includes the Hard Disc Drive, Controller Podule & fitting instructions.
P.S. The 310 upgrade requires a backplane and a fan.

- 3HDP – Hard Disc Podule only £279
- 3HD20 – 20Meg Hard Disc for 310 £359
- 3HD40 – 40Meg Hard Disc for 310 £419
- 4HD20 – 20Meg Hard Disc for 410 £179
- 4HD40 – 40Meg Hard Disc for 410 £299

LANGUAGES (Archimedes)

ANSI 'C'; ISO-PASCAL; FORTRAN 77; all Release II.	£94 each
Cambridge LISP; PROLOG X	£181 each
LOGOTRON LOGO	£55
BASIC Compiler	£89
Archimedes Assembler	£189
TWIN EDITOR	£27

BBC MASTER

MASTER 128K Micro incl. Acorn's: View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER *(carr £7)* **£439**

FREE... FREE... FREE...
Hardware and Software OFFER
AMX Mouse Mk III & SuperArt plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control. With every BBC Master purchased from us this month.

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module		£118
Econet Module for the Master		£49
Twin ROM Cartridge for Master		£8
Quad ROM Cartridge for Master		£12
Universal Processor Adaptor		£75
Master Reference Manual I	(No VAT)	£14
Master Reference Manual II	(No VAT)	£14
Master Advance Ref. Manual	(No VAT)	£17
64K Upgrade Kit for B+		£32
Acorn 1772 DFS Kit complete		£49
ECONET Upgrade Kit for BBC		£42
ALL ECONET UPGRADES Available		
ARIES' Professional IEEE Interface		£238
Morley Teletext Adaptor with ATS Rom		£99
Filestore E01S £899	Filestore E40s	£799
Filestore E60S £1080	Ecolink	£270

NEW

Archie Hand Scanner

Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scalling to any size including stretching and squashing in X and Y directions separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

£149

NEW

Archi Graphic Tablet

This package allows Archimedes users to take advantage of the excellent Aries low cost graphpad (sometimes called a digitiser tablet, but not to be confused with a video digitiser!)

The Archi Graphpad offers performance and accuracy comparable to other graphics tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely.

The software, which is in the form of a relocatable module (RM), intercepts the system calls which control the mouse, and so allows virtually all mouse based Archimedes software to be controlled using the tablet without any modification. The only exceptions are programs which use the serial port, as the tablet is physically connected to this post itself.

Graphics programs such as Artisan, Pro Artisan, AutoSketch, Oak DTP, and the RiscOS Draw, Paint and DTP packages are considerably enhanced by the use of the graphics tablet as opposed to the mouse, although it can, of course, be used with any other mouse driven application.

The software allows the user to define how much of the tablet's 12" x 12" working area to use, allowing very fine control when drawing freehand or tracing from a variety of differently sized drawings, diagrams, photographs, etc.

The tablet driver is compatible with all Archimedes machines, and with both Arthur and RiscOS operating systems.

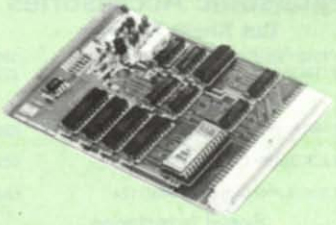
The pointer is moved via a four button puck complete with transparent lens and crosshairs for optimum accuracy. Three of the buttons emulate the Archimedes mouse buttons precisely, the fourth being used for special functions such as setting the position and size of the active working area. The buttons may be re-mapped to allow the relationship between tablet and mouse buttons to be redefined, should this be required.

The software is supplied with a special adaptor lead to connect the tablet to the Archimedes' serial port, and a power lead which plugs onto the Archimedes' main board.

Launch Price £259

(Price includes Tablet, leads and software)

Archimedes Real-Time Digitiser



Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner.

Please write in for further details.

Price £249

Disc Drives DP35-800S

A Double disc drive – with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master Series is the 5.25 inch disk, the standard for the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.

To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S, it contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.

The 5.25" disc drive is 40/80 track switchable. For ease of access, the switches are front mounted. DP35-800S has its own power supply, independent of the BBC Micro.

Watford's new plinth enables users to read, write and format disks both in DFS and ADFS format – currently the accepted standard for the Master Compact and the Archimedes, it also enables the user to read disks written for the Archimedes. Ideal for both BBC & Master.

Launch Offer: **£165** (carr. £7)

Z88 Sinclair's Portable Micro

Watford Electronics are the largest Z88 Dealer in the UK

Only: £199

FREE

With every Z88 purchased from us this month, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

32K RAM Pack or 32K EPROM Pack	£17.35
128K RAM Pack or 128K ROM Pack	£43.40
512K RAM Pack	£169
Z88 Spellmaster for Pipedream (CC)	£51
Z88 Pipedream Spellcheck (Colton)	£52
Z88 Carrying Case	£8.50
Z88 Computing Book	£9.95
AA Nicad Rechargable Battery	£1.50
Battery Charger Compact & Fast	£6
Z88 Serial Printer Cable	£8.65
Z88 Parallel Printer Cable	£24.00
● Z88 to BBC Link £22	● Z BASE £56
● Z88 to PC Link II £30	● Z TAPE £42
● Z88 to Macintosh £49	● Z TERM £42
● Z88 Mains Adaptor £8.65	● Z88 Modem £145

Continued

MONITORS

MICROVITEC 14"

- **1431** – Standard resolution as used on the BBC television computer programme **£175**
- **1451** – Medium resolution, suitable for word processing in mode 0 **£219**
- **1441** – High res, exceeds the capabilities of the BBC micro **£359**
- **1431AP** RGB + PAL and AUDIO **£199**
- **1451AP** RGB + PAL and AUDIO **£255**
- **2030 CS** 20" Med Res **£380**
- **2040 CS** 20" Hi Res **£675**
- Dust Cover for Microvitecs **£5.50**
- **Touchtec 501 Touch Screen** **£239**

14" MULTISCAN COLOUR

- **TAXAN** Multisync 770 Plus **£425**
- **TAXAN** Multiscan 870 16" Monitor **£499**
- **EIZO** 8060H – For technical info. read the review in Micro User, Jan. '89 **£429**
- **EIZO** 8060H Multiscan **£449**
- **EIZO** 9060S Super High resolution multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch **£469**

TAXAN 12"

- Super Vision 3 – **Type 625** Super Hi-res RGB Colour, Green/Colour Switch **£269**
- KX117 – Hi-Res Green Screen Monitor **£79**

PHILIPS

- **BM7502** 12" Hi-res Green Monitor **£64**
- **CM8833** 14" Med. Res Colour Monitor **£195**

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £189

Dust Cover for Phillips Monitors **£6**

SPARE LEADS

BNC Lead for Zenith or Philips	**£3**
Skart Monitor Lead	**£5**
RGB lead for TAXAN Monitors	**£3**
Archimedes Colour Monitor Lead	**£7.50**

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the monitor viewing angle.

for 12" Monitors **£8** (carr. £2.50)

for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

PLOTTERS

- Plotmate A4S **£379**
- Plotmate A3M **£549**

Roland Plotters

(Official Roland Appointed Distributor)

- **DXY 880A** **£560**
- **DXY 1100** **£630**
- **DXY 1200** **£879**
- **DXY 1300** **£1035**

TAXAN KP-815 PRINTER

Offer Price £149

Taxan KP915 132 Column	**£275**
RS232 Interface	**£49**
RS232 Interface with 2K Buffer	**£69**
RS232 Interface with 16K Buffer	**£89**

Panasonic KX-P1081

UK's most popular printer.

SUMMER SALE OFFER only: **£135**

Optional RS232 Interface: **£39**

(Price inludes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us).

Panasonic Printers

- **KX-P1124** 24pin 80col. 192/63 CPS **£259**
- **KX-P1180** 9pin 80col. 192/38 CPS **£155**
- **KX-P1540** 24pin 136col. 240/80 CPS **£435**
- **KX-P1592** 9pin 136col. 216/45 CPS **£275**
- **KX-P1595** 9pin 136col. 288/61 CPS **£355**

- **Panasonic KX-P4450** LASER PRINTER Latest technology at Watford's special offer price **£1,399**
- Spare Toner **£29**
- A4 Feeder **£55**
- Drum Unit **£149**
- Developer **£115**

RS-232 GENDER CHANGERS

Male to Female	**£4.95**
Male to Male	**£4.95**
Female to Female	**£4.95**
25 way Male to 9 way Female	**£4.90**

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	**£175**;	KX-P1540 (P35)	**£185**
KX-P1124 (P36)	**£88**;	KX-P1180 (P37)	**£79**

BUFFERS

P12 4K Buffer Board for 1081	**£55**
P42 32K Buffer Chip for 1592/1595	**£49**
P43 32K Buffer Chip for 1540/1124	**£49**

Serial Interfaces

P17 P1081/1592 **£32** P19 P1124/1180 **£55**

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081; 1592 & 1595	**£8**		
P115 for KX-P1180	**£8**	P145 for KX-P1124	**£8**
P140 for KX-P1540	**£10**		

INTEGREX COLOUR JET

- Colour Jet 132 Printer **£515**
- Paper Roll **£6.50**
- Screen Dump Software **£10**
- Colour Cartridge **£16.50**
- Black Cartridge **£10.35**
- 100 A4 OHP transparencies **£55**
- 8K Serial Interface Optional **£123**

NEW – Intergrex COLOURCEL NPQ Ink Jet Colour Printer **£2,695**

NEC P2200 PINWRITER

24 pin; 80 column; 168CPS – 56CPS LQ; Epson LQ compatible, 7K Buffer; 7 resident FONTS, Friction & Tractor feed, front load single sheet feed, etc.

£269

Pinwriter Serial Interface (optional)	**£55**
P2200 Cut Sheet Feeder	**£59**
Additional Font Cartridge	**£25**

NEC PINWRITER P6/P7 Plus

NEC P6+ 80 columns	**£439**	**NEC P7**+ 136 columns	**£575**
Colour Option	**£74**	Serial Interface	**£73**
Cut Sheet Feeder	**£125**		
NEC Ribbons for		P6 **£8**; P7	**£9.50**
NEC P2200 Pinwriter Ribbon			**£6**

Star Printers

Star LC10	**£159**	NB24-10	**£425**
XB24-10 Colour	**£425**	LC10 Colour Ribbon	**£6**
LC10 Colour	**£215**	Cut Sheet Feeder	**£65**
Star LC24-10	**£279**		

EPSON PRINTERS

EX800	**£410**	LQ850	**£430**
EX1000	**£564**	LQ860	**£539**
FX850	**£315**	LQ1050	**£549**
FX1000	**£425**	LQ1060	**£679**
FX1050	**£439**	LQ2550	**£895**
FX1060	**£679**	LQ2500+	**£839**
LQ500	**£275**	LX800	**£149**
LQ550	**£275**	SQ2500	**£975**
GQ3500 Laser	**£1150**		

CUT SHEET FEEDERS for

EX800 **£149**; FX800/LQ800 **£149**; FX850/LQ850 **£149**; FX1000/LQ1000 **£179**; LQ500/LX800 **£79**; LQ1050 **£175**; LQ2550 **£390**.

TRACTOR FEED for

LQ800 **£44**; LQ850/FX850 **£69**; LQ1050/FX1050 **£85**; LQ2500 **£90**; LQ2550 **£90**

ACCESSORIES

- EX800/1000 Colour Option **£55**
- EX800/1000 Colour Ribbon **£18**
- LQ2500 Colour Option **£65**

(Securicor Carriage on Printers £7

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer.

RS232	**£32**	RS232 + 2K Buffer	**£52**
IEEE 488	**£40**	RS232 + 8K Buffer	**£79**

PRINTER LEADS

BBC Centronics 4' long	**£5**
BBC Centronics 6' extra long	**£7**
Compact's Special Centronics Lead	**£7**
Archimedes Printer Lead 1 meter	**£6**
Nimbus Centronics Lead	**£12**
IBM Parallel Lead 1 meter	**£6**
Double Ended 36 way Centronic Lead 4'	**£7**
Double Ended 36 way Centronics Lead 6'	**£9**
MSX Centronics Parallel Lead 4'	**£12**
RS232 Leads (Various)	**P.O.A.**

Listing Paper (Perforated)

- 1,000 Sheets 9½" × 11" Fanfold Paper **£7**
- 2,000 Sheets 9½" × 11" Fanfold Paper **£12**
- 1000 Sheets 9½" x 11" NCR 2 Part Fanfold **£19**
- 1,000 Sheets 15" × 11" Fanfold Paper **£9**
- 1000 Sheets true A4 Fanfold Paper 70gms **£11**
- 2000 Sheets true A4 Fanfold Paper 70gms **£19**
- Teleprinter Roll (Econo paper) **£4**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50. 2K Sheets £3.00

PRINTER LABELS

(On continuous fanfold backing sheet)

1,000	90 × 36mm (Single Row)	**£5.00**
1,000	90 × 36mm (Twin Row)	**£4.90**
1,000	90 × 49mm (Twin Row)	**£7.50**
1,000	102 × 36mm (Twin Row)	**£6.25**

Carriage on 1,000 Labels £1.00

Perspex Printer Stand

Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand. The printer sits on top and the fanfold paper rests neatly underneath, thus occupying the same space as the printer footprint.

80 Column version **£16** (carr £3)
136 Column version **£16** (carr £4)

Professional Printer Stand

This new professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Additional facilities include: Easy access to paper from both sides, used with both top and bottom feed paper and with its dial controlled paper feed system with adjustable deflector plates it ensures smooth paper flow and automatic refolding.

80 Column version £16 (carr. £3)
132 Column version £16 (carr. £4)

PRINTER RIBBONS & VARIOUS DUST COVERS

Type	Ribbons	Dust Covers
Brother HR15/20	£3.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
IBM PCs pair	–	£6.00
RX/FX80/MX80	£3.00	
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£7.50	£5.00
RX/FX80/85/800/MX80	£3.90	–
RX/FX100/1000	£5.75	–
Kaga/Taxan KP810/815	£4.90	£5.00
LC10 (Black)	£4.25	£5.00
LQ500/800	£3.75	£5.00
LQ1050/LQ2500	£8.50	£5.50
LX80/86/800	£3.80	£4.50
M1009/GLP	£3.80	£3.75
Panasonic KX1080/81	£4.00	£4.75
SQ2500	£23.00	£5.50
Star NL10	£3.75	£4.50
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PVC. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changers

Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spagetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments.)

Connects	Serial	Centronics
2 to 1	£20	£22
3 to 1	£27	£30
5 to 1	£36	£39

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS

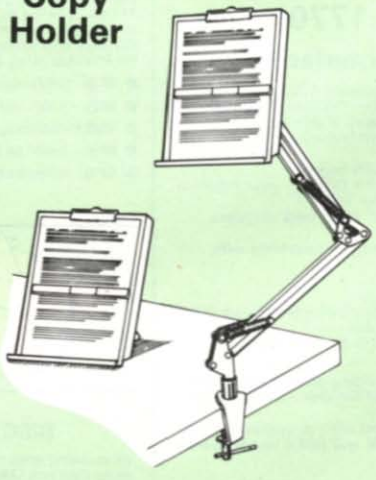
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Printer Plinth	420 x 310 x 105mm	**£12**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)
Angle poise **£12** (carr. £3)

NEW

Handy 2 Way Printer Switch

A handy two way compact printer switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics **£20**
Compact AB Switch RS232 **£19**
(Cables extra at £6 each)

MEGABUFFER 256

The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatibility with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in test unit for both the buffer & your printer.

Only £149 (carr £5)

THE EPSON RX-FX-KAGA PRINTER COMMANDS REVEALED

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out. Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible Printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from BASIC and Wordwise.

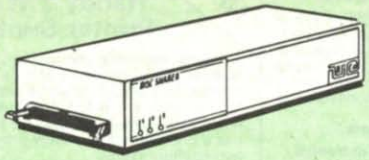
It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

VISA **CREDIT CARD 24 HOUR**
Ansaphone Hot Lines
(0923) 50234 or 33383

Continued

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Launch Price: **£65** Price includes 3 Cables

NOW WITH EXTRA FEATURES AT NO EXTRA COST – Watford's latest DFS 1.44

- Incorporates Acorn's Official Tube Host Code so that those with 2nd processors no longer need to waste a ROM socket on the DNFS.
- Option to DOUBLE the speed of BPUT and BGET.

If you already have the Watford Electronics DFS and wish to incorporate these new facilities then simply return your existing DFS ROM to us together with £5 remittance for an upgrade. Please pack the ROM securely and address the package to our Upgrades Dept.

WATFORD's & ACORN's DFSs

Watford's popular and widely acclaimed DFS has now been available for six years and has gained a large following amongst serious and educational users of the BBC Micro. Owners of Acorn or any other standard DFS can upgrade to our "Ultimate" DFS merely by replacing their DFS ROM. See below for this upgrade. ***(P.S. Watford's highly sophisticated DFS is fully compatible with Acorn standard DFS). (while Acorn's 1770 DFS is fully compatible with Watford's Mk II DDFS)***

- *Watford's sophisticated DFS ROM only* **£16**
- *We will exchange your existing DFS ROM for Watford's Ultimate DFS ROM for only* **£12**
- *DFS Manual (Comprehensive)* *(no VAT)* **£6.95**

(P.S. Our DFS manual is the only comprehensive Manual available for the BBC micro and covers both Acorn & Watford DFSs).

- *DNFS ROM only* **£17**
- *ADFS ROM only* **£25**

(The Single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

NEW

Watford's MkII 1770

Double Density DFS Interface

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features:

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£30.00**.

- Special introductory offer **£39.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£25.00**

Please note, as the MkII DDFS is a hardware and software upgrade, it is not possible for existing Watford DDFS users to simply exchange their ROM for the new version.

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) **£3.20** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.25** Twin CD (with PSU) **£3.90**

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electronics your 3M Appointed Distributor.

- *10 × 5.25" S/S D/D 40 Track Diskettes (744)* **£6.00**
- *10 × 5.25" D/S D/D 40 Track Diskettes (745)* **£7.00**
- *10 × 5.25" S/S D/D 80 Track Diskettes (746)* **£11.50**
- *10 × 5.25" D/S D/D 80 Track Diskettes (747)* **£11.00**
- *10 × 5.25" 1.6M D/S D/D High Density Discs for IBM XT and AT* **£16**
- *10 × 3.5" S/S D/D 40/80 track Discs* **£10.00**
- *10 × 3.5" D/S D/D 40/80 track Discs* **£11.75**
- *10 × 3.5" High Density Diskettes* **£25**

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives, WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 × **M3** 3.5" D/S D/D 80 Track Discs* **£10**
- *10 × **M9** 3.5" Double Side High Density* **£25**
- *10 × **M4** 5.25" S/S D/D 40 Track Discs* **£5**
- *10 × **M5** 5.25" D/S D/D 40 Track Discs* **£7**
- *10 × **M7** 5.25" D/S D/D 80 Track Discs* **£9**
- *10 × **M8** 5.25" D/S H/D Hi-Density Discs* **£14**
- *3" Double Sided Discs* **£2.50** *each*

Special BULK OFFER on 5¼" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
Without Sleeves	£35	£39	£45
With Sleeves	£38	£42	£48

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use. Available in 3½" & 5¼", please specify.

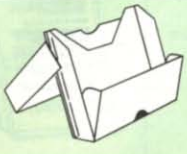
£4

ANTISTATIC LOCKABLE DISC STORAGE UNITS

Gives double protection – Strong plastic case that affords real protection to your discs. Antistatic helps avoid data corruption whilst in storage. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** - holds upto 50 5¼" discs **£4.95**
- **M85** – holds upto 95 5¼" discs **£6.95**
- **M25*** – holds upto 25 3½" Discs **£4.95**
- **M50** – holds 50 3½" Discs **£6.50**
- **M10** – holds 8 of No. 10 Data Cartridges **£15**

* Not lockable



PLASTIC LIBRARY CASES

Holds up to 10 5¼" Discs. **Only £2.00**

DISC PLONKER RACK

When using ones micro, there is a tendancy to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk.
Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds upto eight 5¼" discs.

Protection at Only: **£2**

DISC ALBUMS

Attractively finished in black leather look vinyl. Stores upto 20 Discs. Each disc can be seen through the clear view pocket. **£4**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with an Utilities Disc.

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. *Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

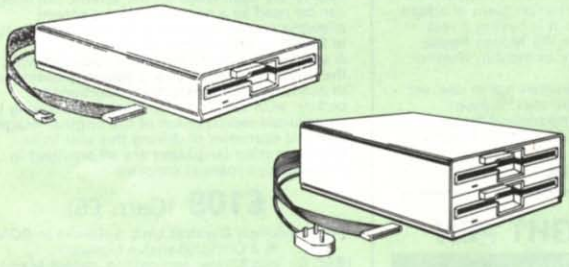
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £18. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. (Turn to the 4th page of our advert for the Plinths).
P.S. All our 5¼" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £75	CLD 400 £168	CS 400S £85	CD400 £188
800K (1.44M)		CLD 800S £153		CD 800S £163

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £6 to £7

Prefix ***C*** *= Cased Drive*
L *= Less PSU*
S *= Single*
D *= Double*

Suffix ***S*** *= 40-80 Switchable*

e.g. CLS400S = Cased Disc Drive, Less power supply unit, single 5¼" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5¼" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3½" and 5¼" Disc Drives simultaneously to the BBC Compact £13

Mysteries of Disc Drives & DFS Revealed

Are you tired of faulty cassettes, and lengthy loading times? Do you want to upgrade your BBC micro to take discs but you get tied up in the plethora of jargon surrounding the choice and use of these systems.

Then The Mysteries of Disc Drives and DFS Revealed is the book for you. It explains in detail the different types of systems available, how they are installed and how to use them. Many examples are given including pre-written programs to call various functions of the DFS available only through Operating System calls. Different types of disc, 40/80 tracks etc. are all explained. This book is ideal for the beginner confused by the plethora of choice available in the marketplace.

£5.95 (Book No VAT)

Special 40/80 Disc Drive/DDFS Mk II Offer

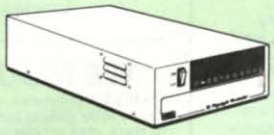
- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both, Single & Double Density modes.
- A comprehensive User Friendly Manual.

A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)

3½" DISC DRIVE OFFER

These top quality 3½" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc. They run directly from the BBC B/Master's own PSU.

● **CLS35 400K Unit £69** ● **CLD35 800K Unit £125**



WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.

This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.

Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!

Compatible with the Master, and the BBc B (with 17 X disc interface).

● 30 Megabyte BBC Hard Disc **£405** (carr £9)

DP35-800S **DP35-800S**

Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

CDPM 800S for the BBC & Master £182
DP35-800 for BBC/Master £165
(For DP35-800S spec. see Page 2 of our advert)
(Securicor Carr. £7)

(The above drive units are 2 Megabytes unformatted)

Continued

- Quest Mouse II & Quest Paint £58
- Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse II only £29
- Quest Paint Software only £34
- Quest Font Disc £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Part Exchange your unreliable AMX Mouse for a Quest Mouse for only £22
- GXR ROM for the BBC Micro £22

(P.S. Quest Paint is not compatible with BBC Compact)

N.B.
1. Quest Paint supplied complete with Software in a 32K ROM, Comprehensive User Guide and a Utility Disc.
2. Quest Font Disc has 22 text FONTS for use within Quest Mouse.

ConQuest

Watford's Quest package is an extremely powerful and flexible drawing package, with very wide and unusual features. However, since its launch various suggestions for even more advanced & powerful facilities were received from the Quest users. ConQuest allows you these more advanced facilities, like, distortion of a cutout to any shape and a full font designer. If you also have a GXR ROM in your machine or you are using a BBC Master then ConQuest will take advantage of this to give ellipses at any angle, sectors and arcs, etc. Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.
Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

RB2 Marconi
TRACKER BALL

RB2 (AMX/Quest compatible) £45
RB2 including Quest Paint £75

THE NEW Mk III AMX MOUSE

ONLY: £59 Inc. Super Art package (carr £3)
(Please specify for BBC, Master or Compact)

MOUSE MAT £3
AMX MOUSE ONLY £29

AMX UTILITY Package £13
AMX SUPERART Package £34
AMX STOP PRESS – A Desktop publising software. Works with Keyboard, Joystick or a mouse £32

PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker £13

AMX DESIGN (ROM) £55
AMX XAM Educational £15
AMX EXTRA EXTRA £16
AMX MAX A gem of desktop (ROM) £15

NEW

ARCHI Mk II MOUSE
An extremely reliable replacement mouse for Archimedes Micro £39

WE MOUSE HOUSE

Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, Monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again.
There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.

Price £4

MARK II LIGHT PEN

Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted.

Price Only £21
(Price includes FREE software Disc and Operating Manual)

FLEET STREET EDITOR

Software pack for BBC Micro £33
Software pack for the Master £39
Software Pack for Compact £40
Admin Xtra Disc Utility £13
Walt Disney Disc Utility £13
Fonts N Graphics Disc Utility £13

BEEB
VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.
This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.
The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.
Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.
Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package i designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.
A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.
Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)
A combination of the Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within Stop Press to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Stop Press's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Stop Press's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£135.00** (carr. £3)

The WAPPING EDITOR

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantge of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

PAGE LAYOUT SECTION

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module is a mode 0 version of the highly acclaimed Quest Paint package, detailed elsewhere in our advert, and incorporates all the same drawing facilities, e.g. pencil, brush, airbrush, polygon, circle, ellipse, fill, cut-and-past, etc., etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

WORD-PROCESSOR

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

THE FONT EDITOR

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designedto take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Upgrading to the Wapping Editor could not be easier since the font editor will convert fonts from other packages, such as Quest Paint or Stop Press (formerly Pagemaker), into Wapping Editor format and a mode conversion utility will convert any screen in modes 1, 2, 4 or 5 into a full grey-scale mode 0 screen. Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser, either independantly or from within the Wapping Editor package.

For convenience all types of file may be stored on the same disc, with the software intelligently and transparently distinguishing between them. Filenames are picked off the screen with the mouse, despensing with keyboard entry wherever possible.

"The Wapping Editor combines sophistication with ease of use and power with simplicity, to make it the most comprehensive and user-friendly DTP system ever likely to be written for the Beeb".

Wapping Editor Software Pack **£69**
Wapping Editor plus Mouse **£89**

NEW

Wapping Font Disc

Sixteen Wapping Editor fonts including smaller versions of Oberon and Daisy and two new sizes of the standard font.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

NEW

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games, etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.
Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.
There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.
A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routines you can archive large numbers of screens onto a single disc.

£15

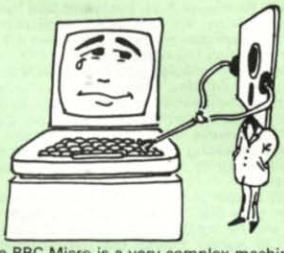
The Beeb HandScan
Watford's Hand-held Scanner for the BBC Micro

Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer for the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilitiesis provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various type of dithering may be selected to simulate the grey levels of a scanned picture. All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware **£135**

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS432, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

DUMPOUT 3

A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including full Mode 7 graphics.
Also provided are window setting utilities and OSWORD calls to plot and read Mode 7 graphics pixels.
Facilities:

- Vertical and horizontal scaling in all graphics modes and mode 7
- Rotation of image by 90, 180 or 270 degrees
- Left hand margin setting
- Screen dump window setting
- Colours appear as grey scale
- Two tone fast dump
- Colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered and User Port triggered dumps

For use with the following printers:
GLP, GP80/100/250, CANNON, STAR, KAGA/TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/400, Panasonic KX1081/82, Mannesman Tally and compatibles.

Only: £25

Continued

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £2)

Aries B-12 Sideways ROM Board

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost.

Price: Aries B-12	**£36**
Aries B-12C	**£5**

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	**£10**
Delta 3B Twin Joysticks	**£15**
Delta 3C Joystick for Compact	**£10**
Delta 14B Single Joystick	**£11**
Delta 14B/1 Adaptor Module	**£12**
Transfer Software Disc-Tape	**£7**
Deltabase B – Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	**£25**
Delta-Cat A mouse eliminator Joystick for the Archimedes	**£26**

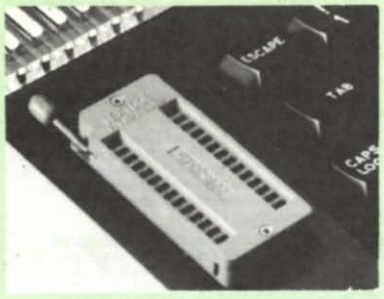
REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£15 (40 or 80 track)

Not compatible with 1770/DDFS.

SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	**£11**
● Spare Cartridges	**£2.50**
● Spare Rack	**£1.50**

ROM Cartridges for the BBC Master
Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc.
Twin **£8**; Quad **£12**

16K DISC RAM

(16K Sideways RAM Module)

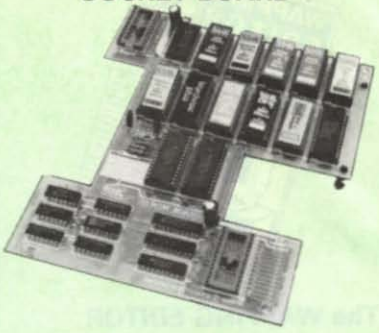
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances).
- Compact construction.
- Supplied complete with Battery Backup.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£32** (carr £2)

P.S. 16K Disc Ram Board is not designed to work in conjunction with a Sideways ROM Board.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 Micro User's independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery backup fitted **£39**
Battery Backup only **£3**
(carriage £2)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

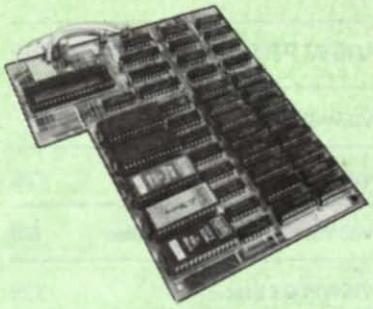
Only: £8

USER PORT SPLITTER UNIT

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaniously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination.

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM ***£48***
- ROM/RAM card with 64k dynamic RAM ***£65***
- ROM/RAM card with a massive 128k dynamic RAM **£109**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit **£17**
- 16k Dynamic RAM for Upgrade **£17.50**
- Battery backup **£3**
- Read and Write protect switches ..... **£2** each

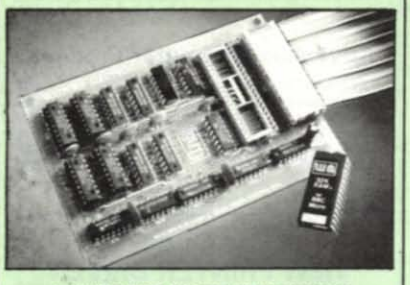
Complete ROM-RAM board
All options installed **£115**

P.S.
Is your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford ROM/RAM Board and pay £5 less

32K

SHADOW RAM- Printer Buffer

Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16K or even 20K, but a massive 32K of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24K of text in memory. This product is recommended as an ideal complement by Computer Concepts.

- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20K of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28K of program space.

- Use the FULL 32K or the bottom 12K of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS423 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138,145,ADVAL etc). Please note only a 12K printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.

- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £2)

(Price includes a comprehensive manual and the ROM)

INCREDIBLE WORDPROCESSING DEAL

Watford's 32K SHADOW RAM CARD and Computer Concept's INTERWORD Wordprocessor package.

at Only **£89** (carr £2)

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs **£11.25**
- Maths with a Story 2 (Disc) 4 further maths programs **£11.25**
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs **£17**
- RELATIONSHIP: Science (Disc) O Level Biology program. **£20.00**
- BONDING: Science (Disc) O Level Chemistry program. **£20.00**
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. **£20.00**
- ELECTRONICS IN ACTION (Disc) O Level program **£19.95**
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. **£20**
- ECOLOGY (Disc) O Level program. **£20**
- POLYMERS (Disc) O Level program. **£20**
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20**
- FOOD & POPULATION (Disc) O Level program. **£20**
- MICROTECHNOLOGY (Cassette) O Level program. **£11.25**
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. **£21.70**
- DEUTSCH DIREKT! (Disc & Audio Cassette) **£19.95**
- Modem Master (Disc) **£11.25**
- ADVANCED TELETEXT SYSTEM **£8.65**
- PERIOD TABLE SOFTWARE **£20**
- Astronomy – Primary (Disc) **£12**
- Computers at Work – Primary **£17.35**
- Introducing Geography – Primary **£17**
- **Introducing Geography 11-17yrs** **£17.50**
- Electric Fields 6-14 years **£11.25**
- BlackQueen Contract Bridge **£13**
- Espana Viva – 3 Discs **£19.95**
- A Vous La France Disc **£21.50**

Educational Software

FUN SCHOOL 2 – Red: 6-8 yrs – Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump.

£11

FUN SCHOOL 2 – Green: Over 8 yrs – Eight programs on Disc. Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape.

£11.25

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Versatile BEEB SPEECH SYNTHESISER Unit

The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued

COMPUTER CONCEPT'S ROMS

ACCELERATOR	£30
CARETAKER Basic Utility	£23
DISC DOCTOR	£28
Graphics ROM	£29
TERMI	£25
COMMUNICATOR	£49
Printmaster	£24

Wordwise £26

Wordwise plus £40

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS DISC: £5

SPELL MASTER £42

Inter SHEET ONLY £37

INTER CHART ONLY: £25

Inter-WORD £36

MEGA-3 ROM

Interword, Intersheet & Interchart – 3 in one ROM **£76**

INTERBASE £49

All Prices Exclusive of VAT

MINI OFFICE II

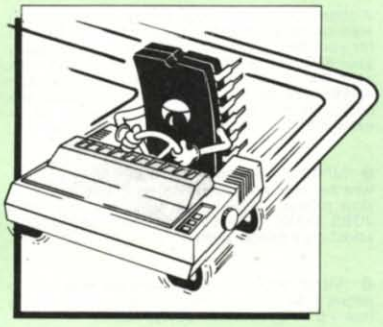
DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.50
Disc Version for the Compact	£18.00

(When ordering please specify for which Micro & 40 or 80 track Disc).

Advanced Computer Products

Advanced Disc Toolkit	£30
Advanced Disc Investigator	£25
Advanced 1770 DFS BBC	£29
Advanced 1770 DFS Master	£30
Advanced File Manager	£25.00
Advanced Control Panel	£30.00

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33

VIEW WORDPROCESSOR 2.1 £35

VIEW 3.0 ROM £48

VIEW PROFESSIONAL £59

VIEWSHEET (Acornsoft) £36

VIEWSTORE £36

VIEWSPELL with 80 track disc £29

VIEWPLOT Disc £20
(Please specify for Master 128 or Compact)

VIEW-INDEX £12

OVERVIEW Packs 1 & 2 £69

Watford's own Sophisticated VIEW PRINTER DRIVERS

Epson FX80 & Kaga KP (Disc)	£8
Juki & Brother HR15 (Disc)	£8
Silver Reed Printers (Disc)	£8

OFFICE MASTER

CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21** (Disc)

OFFICE MATE

- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features.

BEEBPLOT – Provides visual representation from Spreadsheet data.

OFFICE MATE Only £10 (Disc)

BOOKS (No VAT on Books)

15 Hr Wordprocessing BBC/View	£5.95
15 Hr Wordprocessing BBC/WW & WW+	£5.95
30 Hour BASIC (BBC Micro)	£12.95
6502 Assembly Language Programming	£19.95
6502 Application	£13.95
6502 Development Package	£7.50
6502 Programming the	£16.95
6502 Reference Guide	£10.95
68000 Assembly Language	£15.95
68000 Assembly Language Prog.	£19.95
68000 Assembly Language Techniques	£24.95
68000 Machine Code Programming	£13.00
68000 Microprocessor Handbook	£14.95
68000 Programming the	£22.95
68000 User Guide	£8.95
6809, Programming the	£18.95
Advanced User Guide for BBC	£10.95
Amiga Hardware Ref Manual	£23.70
Amiga Machine Lang. Guide	£19.95
Art of Microcomputer Graphics	£16.95
Assembly Language Prog. for the BBC	£10.95
Assembly Language Quick Ref.	£21.95
AY-3-8910 Programmable Sound Generator Data Manual	£3
BASIC 2 – User Guide	£2
BBC – Advanced Graphics with the	£11.75
BBC – Advanced Programming Techniques for	£8.95
BBC Basic Guide	£19.95
BBC Computer Handbook – The Complete	£14.95
BBC – Mastering Assembly Code	£8.95
BBC Micro & the small Business	£5.75
BBC Micro – File Handling On	£8.50
BBC Micro – within the	£13.95
BCPL User Guide	£14
BCPL The Language & its Compiler	£8.50
C Big Red Book of	£7.50
C - A Dabhand Guide to	£14.95
C for Programmers	£9.95
C Programming Lang. 2nd Edition	£24.95
COMAL – Introduction to	£9.50
Complete FORTH	£6.95
Computer Graphics & CAD fundamentals	£9.95
Deutsch Direkti (Book only)	£5.95
DNFS Instruction Booklet	£2
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
File Handling on BBC Micro	£8.50
FORTH – Advanced	£9.95
FORTH on the BBC Micro	£9.95
Hackers Handbook - New	£6.95
Hitch-Hikers Guide to A.I.	£8.95
Introduction to COMAL	£9.50
Inside Information, Computers & Coms.	£9.95
ISO-PASCAL Reference Manual	£9.95
LISP the Language of Artificial Intelligence	£13.95
Logo on the BBC Micro	£7.50
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering Interpreters & Compilers	£14.95
Mastering Music	£6.95
Mastering the Disc Drive	£7.95
Master 512 Guide – Dabs	£9.95
Master Operating System	£12.95
Master Reference Manual Part 1	£14.00
Master Reference Manual Part 2	£14.00
Master Reference Manual – Advanced	£19
MINI OFFICE II – A Dabhand Guide	£9.95
PASCAL – Introduction to	£17.95
PASCAL Programming	£9.45
Practical Disc File Techniques	£5.95
The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
The Software Business	£5.50
Towers Int. Transistor Selectors	£14.95
Understanding Interword – A Beginners Guide	£6.50
Using DOS+ on the 1512 (95% Ok for 512 Bd)	£9.95
View 3.0 User Guide	£10
View Guide (View 2.1)	£4.50
Viewsheet & Viewstore Dabhand Guide	£12.95
Mastering View, Viewsheet & Viewstore	£12.95
VIEW Dabhand Guide	£12.95
Viewsheet User Guide	£10
Viewstore User Guide	£10
Writing Interactive Interpreters & Compilers	£8.45
Wordwise + A User Guide	£9.95
Z88 Computing	£9.95
Z88 Using Your	£9.95

Carriage on Books vary between £1 to £3.50, depending on their weight.

BOOKS for IBM PC & Compatibles

1-2-3 For Business 2nd Edition	£20.95
1-2-3 Command Language	£19.95
1-2-3 Special Edition (QUE) – Using	£21.95
8086/8088 Assembly Language Prog.	£12.45
8086/8088 Programming the	£17.95
Ability – Using	£12.95
Accountancy software in Business – Using	£12.95
Advance C Tech & Application	£19.95
Advanced Tech. in Turbo Pascal	£19.95
Aldus Pagemaker – Using	£21.45
Amstrad Basic 2 Manuals	£12.95
Amstrad Technical Manual for 1640	£19.95
Amstrad PC Programmers Ref Guide	£7.50
Amstrad PC1512-1640 Step by Step – Using	£8.50
Amstrad PC 1512/1640 – Using 2nd Ed.	£9.95
Amstrad PC 1512 PC User Guide – 2nd Ed	£9.95
Autocad – Using Release 10	£26.95
Business companion on the 1640	£12.95
dBase II & III – Understanding	£7.95
dBase II – Working with	£9.95
dBase III – Mastering	£21.95
dBase III Plus	£12.95
dBase III Plus – Complete Reference	£19.95
dBase III Plus – Mastering	£21.95
dBase III Plus Handbook 2nd Edition	£20.95
dBase III Plus – tips, tricks and traps (QUE)	£20.45
dBase III Plus – Quick Ref. Guide	£4.95
dBase III Plus – Quick Prog. Guide	£8.95
dBase Instant Reference (III & III+)	£10.95
dBase IV – Handbook £19.95	
dBase 4 – Understanding	£22.95
DOS Instant Reference (up to 3.3)	£10.95
DOS, Mastering for Versions upto 3.3	£19.95
DOS Power Tools (includes a disk)	£39.95
DOS Plus Manual/Amstrad PC	£10.95
DOS – Programmers Ref. Manual	£22.95
Excel IBM Version – Using the	£22.95
Good Software Guide – for IBM PCs and Compatibles	£19.95
Hard Disc Instant Reference	£10.95
Hard Disk Manage IBM PC XT AT	£17.35
Hard Disc – Managing your 2nd Ed.	£20.95
Hard Disc management – Quick Reference Guide to	£4.95
IBM PS/2 Handbook	£19.95
IBM PC AT – Inside the	£20.95
Local Area Networks 2nd Generation	£19.95
Lotus 1-2-3 Desktop Companion Soft/B	£24.95
Lotus 1-2-3 – Illustrated	£18.45
Mastering 1-2-3 2nd Edition	£19.95
MS-DOS – ABC's of	£16.95
MS-DOS Advanced Programming	£20.95
MS-DOS Handbook 3rd Edition	£18.95
MS-DOS Instant Reference Guide	£10.95
MS/PC DOS 3.3 – Illustrated	£18.45
MS-DOS Masters – Tricks of	£22.50
MS-DOS Performance Programming Under	£18.95
MS-DOS Quick Prog Ref Guide	£8.95
MS-DOS Commands – Quick Reference Guide	£4.95
MS-DOS – Running 4th edition	£21.95
MS-DOS – Supercharging 2nd Edition	£17.95
MS-DOS Users Guide 3rd Edition	£20.95
MS-DOS – Using	£19.95
Operating the IBM PC Network	£18.45
Pagemaker – Desktop Publishing	£15.95
Pagemaker IBM PC – Mastering	£18.95
Pagemaker IBM version – Using 2nd Ed	£22.95
Pagemaker – Illustrated	£18.45
Pagemaker on IBM PC – Using	£24.95
Programming Guide to EGA & VGA Cards	£23.95
Prog. Guide to IBM – P. Norton's	£19.95
Quattro – Mastering	£21.95
Smart – Using	£21.45
Smart – tips, tricks and traps (QUE)	£22.45
SuperCalc 4 – Mastering	£19.95
SuperCalc 4 – Using	£21.45
Symphony 4th Edition – Mastering	£24.95
The Good Software Guide – for IBM PCs and Compatibles	£19.95
Turbo Pascal Advanced Tech	£18.95
Turbo Pascal Complete Ver. 4.0	£21.45
Turbo Pascal Program Library	£18.95
Upgrading & Repairing PC's	£22.95
Using DOS+ on the 1512 (95% OK for 512 Ed)	£9.95
Using Microsoft WORD 2nd Edition	£19.95
Using Pagemaker on the IBM PC	£22.45
Ventura – Mastering	£21.95
Ventura Publishing – Instant incl. DISC	£34.75
Ventura Tips + Tricks	£18.95
Wordperfect 5 – Desk Top Companion	£2.95
Wordperfect Desktop Companion	£20.95
Wordperfect – Illustrated	£18.45
Wordperfect 3rd Ed – Using	£20.45
Wordperfect Made Easy	£15.95
Wordstar & CP/M made easy	£10.95
WordStar Release 5.0 – Mastering	£19.95
WordStar 1512/1640 – Using	£9.95
WordStar User's Ref. manual	£12.50
Wordstar – Quick program Ref. Guide	£8.95
WordStar 4.0 – Using 2nd Edition	£18.45
Xerox Ventura – Desktop Publishing	£14.50
Xerox Ventura Publishing – Inside	£18.45

The Advanced Reference Manual for the BBC Master

At last Acorn's long awaited Advance Reference Manual for the BBC Master Series of Microcomputers has now been published. Watford Electronics' own authors have edited and added missing sections to the original script and produced a very high quality publication.

It features information about:

- Memory Organisation
- Slow data bus
- Detailed circuit description
- Keyboard controller
- Screen display
- User port
- Serial Processor
- Peripheral bus controller
- 1 Mhz Bus
- Machine operating System
- Second processors – Internal, Z80 and 80186
- Disc Filing Systems
- ANFS
- Terminal Emulator & Editor
- View internal format
- Detailed differences between Model B, B+, Master 128K and Compact
- Comprehensive appendix on 65C12 instruction set

At the rear of the manual there are pull out circuit diagrams for the Master 128K. A worth-while addition to any Master owner's library.

All this for just £17 (NO VAT)

NEW

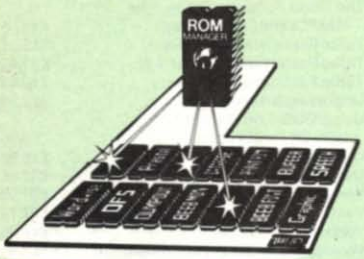
The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)
Example programs on Disc £4.95

Continued →

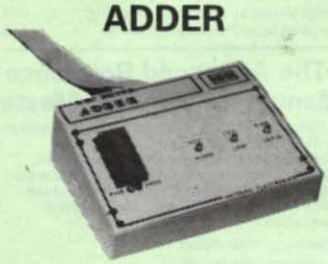
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs. Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
Adder is the ultimate EPROM programmer for the BBC Micro. It will program many different EPROMs up to the very latest 27256 32K devices.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.
Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: From 2K to 32K: 2516, 2716, 2532, 2732, 2764, 2764A, 27128, 27128A, 27256 (Both 12.5V and 21V).

£65 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

Servisol Foam Cleaner

This 415Ml, king size multi-purpose foam cleaner spray is ideal for cleaning the Keyboard, Monitor, Disc Drive and your computer furniture surfaces. Simply spray on the surface to clean and wipe off with a clean cloth.

£2.50

SPARES for BBC Micro

BBC Keyboard	£42	Speaker	£2
Master Keyboard	£62	Keyswitch	£1.50
UHF Modulator	£4	16MHz Crystal	£4
Speaker Grill	£1	32.768MHz Xtal	£1.00
Power Supply	£56	Master PSU	£59
BBC Casing	£20		

Replacement FLEXIBLE 17 way Keyboard Connector £4

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/Monitor Screens.

£2.50

Aerosol Dust Spray

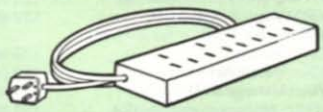
Aerosol Dust Spray
This simple to use aerosol spray is ideal for removing Dust and Dirt deposits from the Keyboards and similar inaccessible places. **£3**

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources which put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£8.50**

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

£8.65 (carr £1.50)

ARIES SPIKE CLEANER UNIT

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete computer system

£13.50 (carr. £1.50)

ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

£2

28pin DIL HEADER PLUG

SOLDER type **£1.50**; IDC CRIMP type **£1.95**

8 WAY DIP SWITCH

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ Keyboard.

Only **£1.00**

28 pin ZIF SOCKET (Textool) £6.95

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

CONNECTING LEADS

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug to 3 pin DIN Plug + 1 Jack Plug	£2.50
to 7 pin DIN Plug	£3.00
to 3 Jack Plugs	£2.50
6 pin DIN to 6 pin DIN Plug (RGB)	£3.00

DISC DRIVE POWER LEADS
Supply from BBC power supply to standard Disc Drive connector.
Single **£3.00** Dual **£3.75**

DISC DRIVE INTERFACE LEADS
BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
ECONET (5 pin DIN)	35p	50p
Paddles (15 pin 'D')	150p	250p
Disc Drive Plug 4 way	100p	–
6 way Power Connector	120p	150p

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK £8

CHIP SHOP

DS3691	£4.50
DS88LS120	£5.25
LM324	£0.45
SN76489	£5.50
SAA5050	£8.75
UPD7002	£6.00
2764-250nS	£2.80
27128A-250nS (12V5)	£3.00
27128-250nS (21V)	£5.25
27256-2	£3.99
27512-2	£7.99
27C101G (1 Meg)	£13.95
4013	60p
4020	£0.90
4164-15	£3.25
4464-12	£9.95
4464-15	£8.25
4816 RAM	£2.00
41256-15	£8.25
41256-12	£9.75
6264LP-8K	£6.00
6502A CPU	£4.50
65C02 3M	£9.75
65C12	£9.00
6512A	£10.00
6522	£3.40
6522A	£4.50
62256ALS-15	£13.00
6818	£4.00
6845SP	£6.00
68B50	£2.95
68B54	£7.50
7438	40p
74LS00	25p
74LS04	25p
74LS10	25p
74LS123	80p
74LS163	70p
74LS244	80p
74LS245	£1.00
74ALS245	£2.75
74LS373	£1.00
74LS393	£1.00
75453	70p
75159	£2.00
8271	£52
9637	£2.00
ICL7673PA	£2.00

ASSORTED ROMS

ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
Acorn BCPL	£42
Acorn COMAL	£38
ACORN DNFS	£17
Acorn FORTH	£32
Acorn Graphics	£25
Acornsoft C Disc	£45
Acorn LISP	£19
Acorn LOGO	£42
Acorn OS B+	£25
Acorn OS 1.2	£14
Basic Editor	£24
BBC PCB Designer	£49
Beebfont	£25
Beebmon	£22
Buffer & Backup	£20
Communicator	£49
EPSON NLQ ROM	£25
Graphics Extension Rom	
GXR-B	£21
GXR-B+	£22
ISO Pascal	£51
ISO-Pascal Stand Alone Generator	£30
ICON Master	£28
Logotron LOGO	£39
Master OS ROM	£38
Micro Prolog	£62
Microtext Disc	£46
Microtext Rom	£199
NLQ DESIGNER	£25
Pendown ROM	£29
ROMIT	£29
Serial ULA	£13
TED	£35
Termulator B, B+	£28
Video ULA	£14
ULTRACALC II	£26
1Mb OS ROM	£39

Now for a touch of FINESSE when you choose an Aries PC from Watford

FREE... Hardware and Software worth £300, with every Aries PC System purchased from us

The Aries IBM PC-XT 88 and Aries PC AT286 compatibles are now supplied with Digital Research's GEM, the powerful Finesse 1.1, Desk Top Publishing package and Multiwriter WORDPROCESSING software, (in addition to PC Organiser, MSDOS and 12 months on site maintenance warranty). So not only you get the best all round value in PC compatibles, but you also get a complete and powerful WYSIWYG DTP software package that takes you from typewritten text onto typeset quality layouts. LOGITEK MOUSE too is included with the package. P.S. To operate Finesse DTP, you require a Hard disc system.

WATFORD GIVES YOU MORE FOR YOUR MONEY.

ARIES PC-XT 88

Specification:

- 16 Bit Intel 8088-2 or NEC V20 78108 microprocessor, running at 8MHz or 4.77MHz. (3 times faster than IBM PC/XT).
- 8087-2 maths co-processor, optional.
- 640K minimum expandable to 1024K on system board, extra 384K RAMDISK available.
- 360K Single Floppy (optional 2nd Floppy/3.5"/20MB Winny/T. Streamer).
- CLOCK on System board, gives non stop DATE & TIME.
- 8 expansion slots.
- RS232 with two ports.
- Microsoft MS DOS 3.30.
- Mono graphics/parallel card.
- Legal BIOS and built in games port and clock.
- 102 keys keyboard.
- 150W power supply.
- GW-BASIC 3.21.

ARIES PC AT286

Specification:

- 80286 microprocessor.
- Optional 80287 Maths co-processor
- 640K RAM standard expandable on-board to 4MB.
- 1.2M Single Floppy (optional 2nd Floppy/3.5"/Winny/T. Streamer)
- CLOCK on System board, gives non stop DATE & TIME.
- 8 expansion slots.
- Serial/Parallel Card.
- Switchable Speed 8/12M Landmark test at 16MHz.
- Microsoft MS DOS 3.30.
- Mono graphics/parallel card (Herc. Compt.)
- Slide in metal case with function display.
- Legal BIOS and built in games port and clock.
- 102 key keyboard.
- HDD/FDD Card.
- 200W power supply.
- GW-BASIC 3.21.

FREE 12 month On-site Maintenance warranty (UK mainland) included in the price

Available in the following configurations:

- ***System 1*** *– Aries PC-XT 88 Basic System including FREE Bundled Software & Hardware* ***£445***
- ***System 2*** *– Aries PC-AT 286 system 1 as above plus 14" hi-res monochrome Flat Screen monitor* ***£799***
- ***System 3*** *– Aries PC-AT 286 System 2 as above plus a 720K 3.5" Disc Drive fitted* ***£889***
- ***System 4*** *– Aries PC-AT 286 System 2 plus a 20MB Hard Disk fitted* ***£995***
- ***System 5*** *– Aries PC-AT 286 System 2 plus a 40MB Hard Disk fitted* ***£1199***
- **System 6** – Aries PC-AT 286 / EGA hi-res Colour System, Aries EGA Monitor/EGA Card & 40MB Hard Drive fitted. **£1399**
- **System 7** – Aries PC-XT 88 System 5 plus Ultra High Res VGA/Multisync Colour Monitor & Card plus 40MB Hard Disc Drive fitted **£1149**

Available in the following configurations:

- ***System 1*** *– Aries PC-AT 286 Basic System including FREE Bundled Software & Hardware* ***£759***
- ***System 2*** *– Aries PC-XT 88 system 1 as above plus 14" hi-res monochrome Flat Screen monitor* ***£489***
- ***System 3*** *– Aries PC-XT 88 System 2 as above plus a 720K 3.5" Disc Drive fitted* ***£579***
- ***System 4*** *– Aries PC-XT 88 System 2 plus a 20MB Hard Disk fitted* ***£799***
- ***System 5*** *– Aries PC-XT 88 System 2 plus a 40MB Hard Disk fitted* ***£849***
- **System 6** – Aries PC-XT 88/EGA hi-res Colour System, Aries EGA Monitor/EGA Card and 40MB Hard Drive fitted. **£999**
- **System 7** – Aries PC-AT 286, Ultra High Res VGA/ Multisync Colour Monitor & Card plus 40MB Hard Disc Drive fitted **£1499**

If you want a different combination, we will be pleased to configure a system to your specific requirement. Please telephone our PC department for price.

Prices subject to change without notice and available on request. ALL OFFERS subject to availibility.
Mail Order and RETAIL SHOP. Trade and Export inquiries welcome. Government and Educational Establishments' OFFICIAL ORDERS Accepted.
Shop Hours: 9.00am to 6.00pm. Monday to Saturday. Thursdays 9am to 8pm. (Free Customer's Car Park)

VAT: UK customers please add 15% VAT to cost incl. Carriage. CARRIAGE: Unless stated otherwise, minimum £1.50 on all orders. £3 on Larger items. On bulkier items, £7 Securicor charge applies (UK mainland only). Overseas orders, carriage is charged at cost.

Specifications of all products are given in good faith but is subject to change without notice. Some items vary in their availability. Please ring for latest delivery situation.

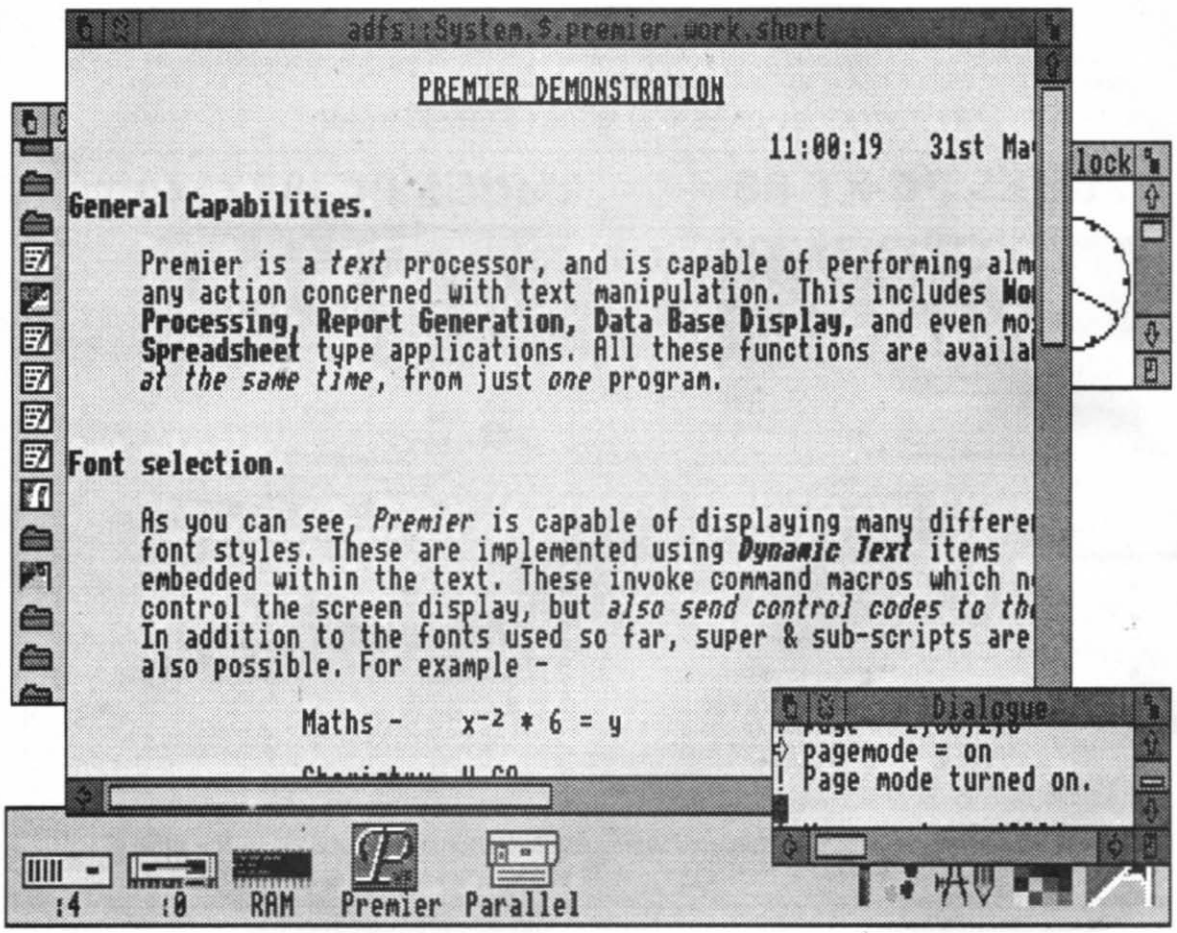
Watford Electronics

JESSA HOUSE, 250 Lower High Street, WATFORD WD1 2AN, ENGLAND
Telephone: (0923) 37774; Telex: 8956095; FAX: 01 950 8989

ORDER VIA MicroLink 72:MAG030

Premier

The Archimedes Text Processor


adfs::System.$.premier.work.short
PREMIER DEMONSTRATION
11:00:19 31st Ma
General Capabilities.
Premier is a text processor, and is capable of performing alm
any action concerned with text manipulation. This includes Wo
Processing, Report Generation, Data Base Display, and even mo
Spreadsheet type applications. All these functions are availa
at the same time, from just one program.
Font selection.
As you can see, Premier is capable of displaying many differe
font styles. These are implemented using Dynamic Text items
embedded within the text. These invoke command macros which n
control the screen display, but also send control codes to th
In addition to the fonts used so far, super & sub-scripts are
also possible. For example -
Maths - x-2 * 6 = y
Dialogue
pagemode = on
Page mode turned on.
lock
:4
:0
RAM
Premier
Parallel

Premier, is a command driven text processor, capable of almost any text processing function, interactively or from compiled command files. A unique Dynamic Text feature simplifies control of screen and printer, and permits spread sheet like items to be included in reports, customised letters, invoices and forcasts.

Premier comes complete with the word processor application illustrated above, key strips, manual, and full free maintenance during 1989.

Please supply -

Name:-
Address:-

- ☐ Full details of Premier
- ☐ A demonstration disc for £4.35 + VAT (refundable)
- ☐ Premier complete, for £96 + VAT
- ☐ I enclose my cheque for the full amount
- ☐ Please debit my credit card account

VISA

Access

SIGNED:-

CARD NO:

EXP. DATE:

Circle Software

33, Restrop View,
Purton, Swindon,
Wilts. SN5 9DG
Tel: 0793 770021

Spelling it out

John Allen checks the usefulness of a new PipeDream adjunct

Product: PipeDream SpellCheck
Price: £49.45
Supplier: Colton Software, Broadway House, 149-151 St Neots Road, Hardwick Cambridge CB3 7QJ.
Tel: 0954 211472

PIPEDREAM is proving to be a big seller on the Archimedes, which is good news for compatibility, since it is also available on three other machines – the BBC Micro – as View Professional – the Z88 and the PC. Colton Software is developing the product further and has produced a spelling checker add-on, PipeDream SpellCheck, which can be installed into PipeDream and work within it, rather like Spell-Master does with word processors on the BBC Micro.

Of course PipeDream is more than just a word processor – it is probably best as a spreadsheet – but the addition of a spelling checker means that it can be taken seriously for writing.

It works with PipeDream version 2.2 or later, but if you have an earlier one Colton Software will exchange it if you send in the master disc and a stamped addressed envelope. To install SpellCheck it is necessary to start again with a fresh uninstalled copy of PipeDream. It is quite simple and the result is more files on the PipeDream disc or in the hard drive directory if you have one and an extra *Spell* menu. Like the other PipeDream commands, SpellCheck can also be used via ALT sequences.

Before looking at SpellCheck in detail it is worth making it clear what a spelling checker does, which is compare words it is given against a dictionary to see whether they exist. It cannot check for context, so will not pick up mistakes like *there* in a document instead of *their*. Nevertheless most are simply typing errors which are found easily.

SpellCheck has a dictionary of around 80,000 words and it is possible to add more in the form of user dictionaries. These are intended for technical terms and proper nouns, but in practice I just use it to collect any words that I know to be correct but are not in the supplied dictionary file.

Both the main and user dictionaries are on disc, but if you are using floppies they should be loaded into the machine to allow faster access. This also means that the PipeDream disc can be taken out of the drive. There are a number of ways that SpellCheck can be used, but the two most useful ones, as with Spell-Master, are checking words as they are typed and checking whole documents.

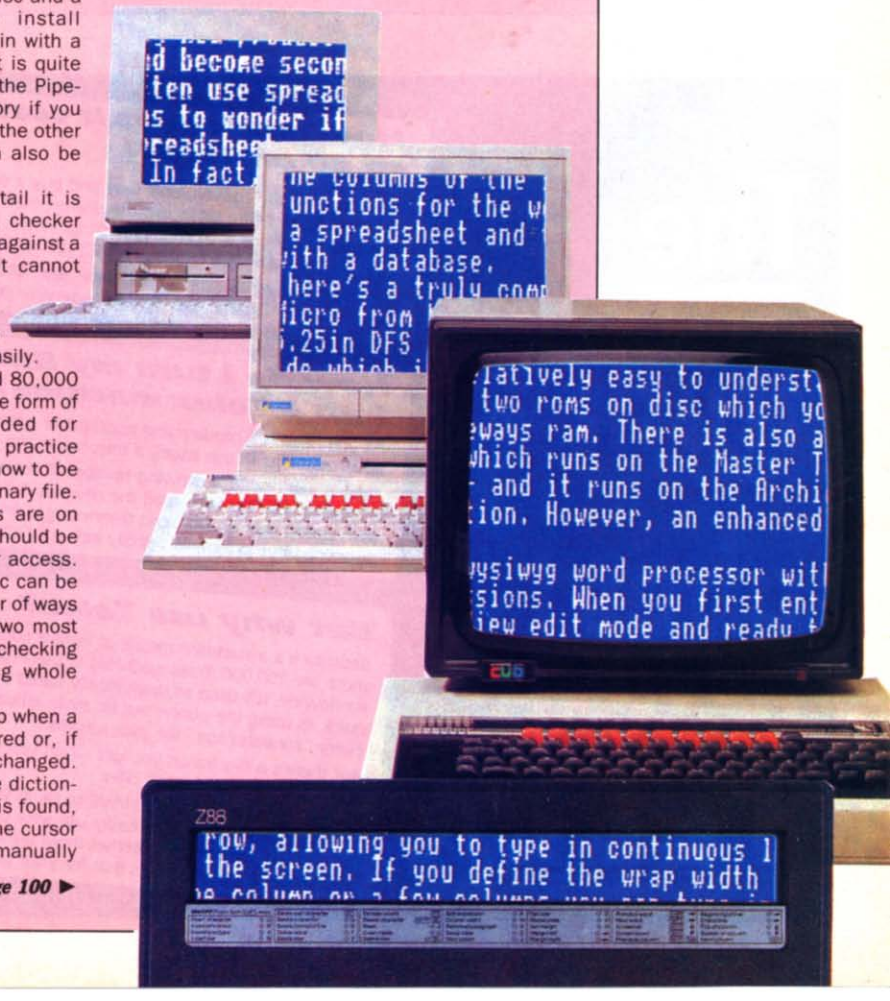
With the former the micro gives a beep when a word isn't recognised. This can be ignored or, if the word is obviously wrong, it can be changed. Alternatively you can browse through the dictionary and locate the correct word. Once it is found, pressing Return puts it into the text at the cursor position, but it is still necessary to manually

Turn to Page 100 ►

OTHER USES

As with Spell-Master, you can browse through the dictionary using wildcards in place of some of the letters. This allows the dictionary to be scanned for all words, say, with a particular ending, or by setting single letter wildcards it can be used to help solve crossword puzzles where only some of the letters are known.

The dictionary can also be searched for anagrams which might be useful to crossword addicts, provided they are prepared to cheat.



◀ From Page 99

delete the original.

If a whole file is being checked a dialogue box is displayed every time an unrecognised word appears, giving options to correct it manually, find a replacement by browsing through the dictionary, ignore the word or add it to a user dictionary. If the word is changed the new word will replace the original in the document before continuing with the check. I was disappointed to find that, unlike Z88 Spell-Master and many similar products on other machines, it does not make guesses at what the word should have been.

The usefulness of a spelling checker rather depends on what words are in the dictionary and the algorithms it uses to analyse text. SpellCheck defines a word as something that starts with a letter and only contains letters, apostrophes (') and hyphens (-).

I was reviewing SpellCheck at the same time as writing scripts for a Radio 4 science education series, so my exploration of the dictionary has been biased towards the scientific. The yardstick I compared it against was Spell-Master and, in all, I found the coverage of useful words surprisingly patchy. Spell-Master has a smaller dictionary, but somehow it seems to contain more of the words I use.

SpellCheck follows correct usage more accurately, but that does mean that some words that are common usage are missing – like *contraflows*, *hand-held*, *forecasters* and *menstrual*. Also only very few of the common colloquialisms with apostrophes are there – omissions include *I've*, *shouldn't*, *they're*, *we'll* and *you've*. None of these are strictly correct in written English, but all are in common use.

As you would expect, very few names or places are there – although *John* was included – and two letter groups, such as post codes, were picked up as errors which Spell-Master simply ignores.

In order to be flexible a number of dialogue boxes appear from time to time. These often entail changing parameters which, while easy enough to do – generally only using the cursor keys – give scope for error when you are in a hurry and sometimes they are unnecessary. For example, after selecting check as you type from the menu a dialogue box appears to ask whether to switch checking on. This has a default of the current state *No* so to start checking it has to be changed to *Yes*, using the right cursor key, before pressing return.

Nevertheless, if you use PipeDream for word processing on an Archimedes then SpellCheck is close to essential.

PipeDream was reviewed in the August 1988 issue of *The Micro User*.

SUMMING UP

SpellCheck certainly adds the ingredient that turns PipeDream into a modern word processor. The dictionary is large but does have some surprising omissions. However these can be quickly covered by adding words to a user dictionary.

The truth about TELEX

How much does it cost to go on Telex?

You could go the conventional way and buy a dedicated Telex machine. The cheapest will cost you £1,604 (the Whisper), the dearest £2,892 (the Cheetah). You will also need a separate telephone line, costing £101 to install, plus £404 a year rental. That's a total outlay over the first year of a minimum of £2,109. (All prices include VAT.)

Or you could do what more and more BBC Micro users are doing – use your BBC Micro to double as a Telex machine. And just use your ordinary telephone!

How do I turn my BBC Micro into a Telex machine?

All you need is a modem and appropriate communications software (see the advertisements in this issue), a telephone, and a subscription to *MicroLink*.

Telex is just one of a growing number of services available to micro users on *MicroLink*. You can also read the news as it happens, go teleshopping, create your own closed user group, send telemessages and electronic mail right round the world, download free programs directly into your micro . . . and much more.

But why use Telex?

Because it's a standard means of instant communication between businesses. Today there are 150,000 Telex machines in use in Britain – and more than 2 million worldwide. It's used to dramatically speed up business communications – it's just as quick as using the phone but far more efficient, because you have a hard copy of every "conversation" for your records.

But there's a big bonus you get when you use *MicroLink* for Telex that the conventional way doesn't offer.

With *MicroLink* you don't HAVE to be in your office to send or receive Telex messages. You can just as easily use your computer at home (or even a portable). So now you can check whether there are any Telex messages waiting for you – anywhere, anytime. How's that for your business efficiency?

How to join: Phone 0625 878888

Down memory lane, street, avenue...

Bruce Goatly goes word hunting

Product: Keyword
Price: £29.95 (mail order only)
Supplier: Swift Software, 347 London Road, Hazel Grove, Stockport, Cheshire SK7 6AA

WHAT was that word? It was on the tip of my tongue a moment ago. Perhaps it will come back to me in a while if I don't think about it. If this thought has ever hit you while in the middle of writing some purple prose you will know how distracting, disruptive and irritating it can be. If it has happened to you you've probably discovered the benefits of a thesaurus – a book of words rather like a dictionary.

But whereas a dictionary is arranged alphabetically a thesaurus is organised by ideas or topics. So *bore* could lead you to the concepts *breadth*, *pierce*, *wave* and *tedium*, all relating to different meanings of the same word.

It can take a long time to find the exact meaning you want among the wealth of human intellect in such a book. Now Keyword has arrived, extending this idea to interactive help for word processing on the Archimedes. It offers more than 10,000 words and nearly 1000 subject headings.

Starting it up merely involves double-clicking on the directory viewer icon of !KeyWord, and after a few seconds the Keyword icon appears on the bar to show the utility is ready for action.

Clicking Select on the icon bar calls up the Keyword window. This consists of an 18-character one on the left where you type in your inquiry and a larger window on the right where words and categories found will appear. The dictionary is held on disc, which must therefore be present while Keyword is in use. You can also load it on to the ram disc for virtually instantaneous performance if you can spare 264k of memory.

Imagine looking for a word that has something to do with being speechless, you type in the word *speech* and after a brief whirr of the disc two matched words are shown – speech and speechless. Clicking Select on speechless yields two categories *muteness* and *wonder*. Clicking the former reveals 16 possibilities, of which *dumbfound* is close enough.

There is no doubt that this is a very useful and powerful piece of software. As it operates under Risc OS it can be used while you are in the middle of word processing – simply point the mouse and off you go. It also takes up much less shelf space than a printed thesaurus and it is much quicker, even if you are an expert index-flicker. Lastly it is fascinating to browse through, illustrating the bewildering complexity of meanings inherent in the English language that makes a thesaurus necessary in the first place.

It has its drawbacks: It is more expensive than even the largest printed thesaurus I could find in my local shop and unlike book editions it fails to separate entries by parts of speech.

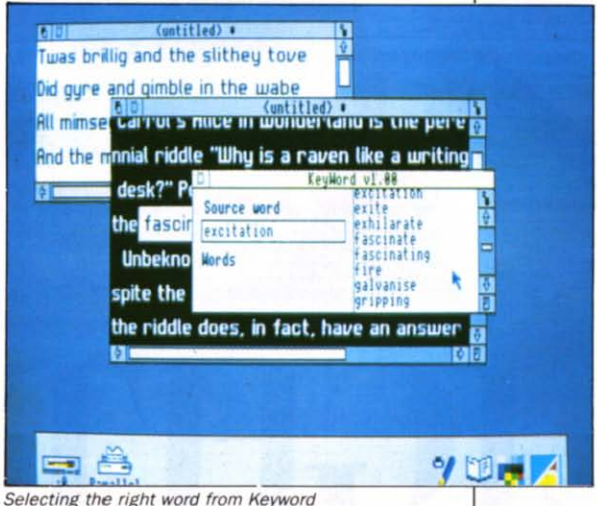
Sadly, there are a number of spelling errors – for instance indefinate, defense, intelligability – which the second edition, being supplied is claimed to rectify. Also, despite the implication on the back of the manual, it does not seem to show antonyms, only synonyms.

Purely from the point of view of someone who loves the richness of expression that the English language affords, I have to say, regretfully, that although 10,000 words represents many times the average person's vocabulary, the scope does not feel broad enough for use by professional writers who may need to write in depth on any subject.

As a true thesaurus, therefore, Keyword is limited by its size. However, as a word finder for everyday use it is excellent. Next time I am stuck for a word I shall be using Keyword rather than reaching for the thesaurus on the bookshelf. Give me convenience every time.

Summing up

Keyword is a very handy utility to have around, especially if your memory has gaps which once contained words. As a memory-jogger it is very quick and convenient to use. It does seem a bit pricey though for the number of words available.



Selecting the right word from Keyword

S·C·A·N·LIGHT

The Hardware

Scan-Light consists of a half-width expansion board (that will fit into any Archimedes), with on board ROM software and a choice of scanners. The hand-held scanner is able to scan or digitise pictures, text, signatures, diagrams from loose pages and books at 200 dots per inch. The full width version can scan complete A4 pages of information while the half-width scanner is restricted to a scan width of 105mm (just over 4 inches).

Both scanners have a brightness control and two different scan modes—normal monochrome mode suitable for line graphics or text, and a dithered mode suitable for photographs or half tone pictures.

Scanning a document is simple, the scanner is placed at the top of the page, the scan button is held down and the scanner dragged down the page. As it moves over the document the scanned image is shown on screen and captured in the computer's memory.

The Software

All the necessary scanner controlling software is included on a ROM as part of the interface board—it does not require programs to be loaded from disc.

The software is WIMP based and completely RISCOS compatible. This ensures it is both easy to use (all its features are controlled by menu options) and that it can multi-task with other RISCOS applications and run under the RISCOS desktop. (It is also completely compatible with the older Arthur operating system). Software features include:

- A full page preview is displayed, as the image is scanned, showing the digitised image as the scan progresses down the page.
- Once scanned the image is shown full size within a re-sizeable, scrollable window. The image may be magnified or reduced by any amount from 1% to 999% of original size.
- Pixel editing facilities allow individual pixels to be drawn or "undrawn".
- A variety of printer drivers is included to transfer the image to a range of dot matrix, inkjet and laser printers.
- A special grey-scale preview mode anti-aliases the scanned image to produce a true grey-level picture, allowing near photographic quality images to be obtained.
- Scanned images, or any selected part, may be saved in a variety of ways:
  (i) As a compressed data file (saves disc space).
  (ii) As a monochrome sprite.
  (iii) As a 16 grey-level anti-aliased sprite.

The latter option is ideal for incorporating pictures or photographs into other programs such as Paint and Draw or any DTP program such as the Acorn DTP or Impression programs.

LIGHT

Scan-Light

Now you have twice the choice!

Scan-Light, in conjunction with the outstanding graphics facilities available on the Archimedes, finally takes computers away from the text only background to the point where they can handle both text, graphics and digitised pictures with equal ease.

Scan-Light Junior

This half-width scanner provides a low cost alternative to the full A4 width version. It offers the same facilities and runs with exactly the same software but is limited to capturing 4 inch wide images. In addition, Scan-Light Junior offers a choice of scan resolutions from 100 dpi to ultra-high 400 dpi.

Prices

Scan-Light Junior £189.00 + VAT for half-width scanner, interface board and software.

Scan-Light £449.00 + VAT for A4 width scanner, software and interface board.

Access and Barclaycard welcome.

Scan-Light runs on both the Arthur and RISCOS operating systems, and requires a 1 MByte machine.

Money-Back Guarantee

We offer a full, no quibble, money back guarantee with Scan-Light. If for any reason you are not satisfied with this product you may return it for a full refund. This is in addition to our normal parts/labour guarantee and our free software update service.

The scanner, interface and ■ software for the Archimedes

Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts HP2 6EX
Tel: Hemel Hempstead 0442 63933

MICRO USER CLASSIFIEDS

● Cambridge Co-processor (1Mb, inc. C, Forbran 77, Iso-Pascal, Lisp, BBC Basic), £335. Prefer buyer collects. Tel: 01-878 5261 evenings/weekends.

● Master 512k, 40/80 drive, Plinth, Amber hi-res monitor, manuals, £200 worth of software, £550. Tel: 0895 33991.

● Z88, 128k eprom-pack, power supply, eprom eraser, BBC Link, parallel printer cable, Z88 computing book. Worth over £400 new! All boxed, excellent condition, great bargain at £310 ono. Tel: Huddersfield (0484) 542116

● BBC B 128k SWR, 1770 DFS, 40T SS drive, AMX Superart + mouse, Morley Teletext Adaptor, Oxford Pascal, Mini Office II, ZIF socket, books, joystick, magazines and many games. £400 ono. Tel: Watford (0923) 896812.

● BBC B Issue 7, 40/80T double disc drive, datacorder, £250 software, 45 magazines and other goodies. £900 new, asking £400. Tel: 0474 560459 after 4pm.

● Archimedes 310M, colour monitor, MSdos, 40/80T D/S 5.25in second drive and Zarch game. £950 Tel: Watford (0923) 779878.

● BBC B, Watford DFS 1.43, 80T D/S disc drive, 16K sideways ram, Wordwise+, monitor stand £300. Tel: Watford (0923) 779878.

● BBC B + ADFS + 40/80 track drive + joysticks + programs + magazines including complete Beebug, little used hence selling to pay mortgage! Just £270 Tel: Mr Libman 01-558 2117 8am to 5.30pm.

● Z80 second processor for BBC. Lots of CP/M software (Pascal, Cobol, etc) £175. Tel 01-340 5101.

● Master Compact, hi-res colour monitor, printer, manuals, £525. Teletext adaptor £65. Tel: 02993 4476.

● BBC B, 1770 DFS, View, Epson LX80 printer, Music 500, mags and games £300. Tel: Medway (0634) 47876.

● Z88 128k ram, mains adapter, eproms, PC Link, £175 ono. Tel: 0962 712530 (Winchester).

● BBC B dual D/S drives £150, Watford digitiser £60, 32-shadow ram-bd £40, Pres ACP £10, Pres AFM £10, rom-extension + 16k ram £18, Torch Graduate MSdos 3.2 8088 256k ram + twin drives for BBC B £80. Tel: 0664 69119.

● Microvitec 1451, mid-res colour monitor £110. Phone 01-644 3358 (Sutton).

● Master 128, 3.5in drive, Replay Termulator, printer (Microline OKI80), Spy vs Spy, games etc, books, all leads, very good condition, £500 ono. Tel: 027874 212 (Holford).

● SigmaSheet for Archimedes £55. Tel: (Evenings) 0444 450633 Risc OS upgraded.

● BBC B, twin DS drives, Canon printer, hi-res monitor, Viglen unit, mouse, joystick, shadow ram, rom board, loadsaroms, 16k sideways ram, £500 ono. Tel: 0245 266140.

● Integra-B, expansion board (BBC B) including extra 32k ram chip £100. No offers 08515317 evenings also Watford mouse £20 (New).

● Wanted Viglen Console for BBC B. Tel: 0506 843168.

● BBC B Watford's rom/ram 128k + 16k battery backup. See Watford's advert £50 0562 823104.

● BBC B, colour monitor, Morley teletext, joysticks, data recorder, speech synthesizer, Forth rom, games, books, £500 Tel: 0663 62013.

● Master £300, 28Mb Viglen Winchester £350, Taxan G25 £250, Morley T/Text £60, 40/80 DS/DD £65, 512k £85, Turbo £80, Co Pro Adapter £15, AA board £20, manuals, boxes. Reading (0734) 318686.

● Immaculate BBC B 7 40/80T drive, Watford MK11 1770 DDFS + Speech, Dumpout 3, 30 discs + large lockable box, mono monitor, Fleet St Editor, joystick (int), Sideways Zif, list goes on... Bargain £450. Tel: 01-570 5256 (eves) Ask for Satnam.

● Wanted Solidisk 2 Meg128 Also DABS Press Master Emulation rom or disc. Tel: Dave (0375) 376022.

● Bargain BBC B, Wordwise, Super Art AMX Mouse, DS/DD 40/80T d/drive, Microvitec colour monitor plus Epson printer, leads and manuals for all. All in good condition and games. Quick sale £650 ono. 01-450 4567 after 5.30pm.

● BBC B Watford DFS 1.42 40/80T drive, ATPL Sideways, many roms including Wordwise+, Interchart and Intersheet manuals etc, joystick, tape recorder, discs galore. Offers 01-218 2264 daytime.

● BBC Issue 7, data recorder, DDFS 40/80T disc drive, Sideways rom-port, spreadsheet, database, graphics package, and £300+ worth of software. Only £320. 0474 365715.

● Canon PW1080A printer £100, Taxan KX117 green monitor £55, both boxed and as new still under guarantee. Tel: 01-393 0563.

● BBC B, Acorn DFS, dual 40/80T Cumana drive, Shinwa printer, colour monitor, data recorder, teletext adapter, software and manuals. Extras £500. Tel: 0293 560954.

● Render Bender. Boxed as new £40. Tel: Steve 0222 613365.

● Solidisk FourMeg 256k SWR board with software £55. Tel: 0252 545125.

● BBC B+ OS 2.0 with Opus Challenger 3, 512k ram, Wordwise Plus, £310. 0273 581079.

● BBC B Issue 7, d/drive, S-ram, Wordwise Plus, software extras £265. Telford 605288.

● BBC B, Opus Challenger with 512k, AMX Mouse, Superart, Pascal, speech, Watford solderless rom board, recorder, joystick, mono monitor, lots of software, All manuals, books, £350 ono, Tel: 0633 412362 after 6pm.

● Swap+. Wanted in full working order BBC B, 40/80T drives, DFS, colour monitor in exchange for unused Z88 inc carry case, BBC lead and 128k ram. Phone: 0491 575120.

● Master 128 with MosPlus, ADT, Exmon, HyperDriver roms £275. 512 Co-processor (80186) plus shareware £55. BBC Model B OS1.2 Issue 7 DFS, Wordwise Plus £175. Morley Teletext Adaptor, ATS roms £45. Taxan Supervision 620 monitor £175. Dual 40/80T 400k disc drive

PLEASE PRINT THIS AD IN THE NEXT MICRO USER

Name_____

Address_____

Cheque enclosed for £_____
(minimum £2 for 10 words)

I certify that any software offered for sale is original and not a copy

Signed_____

POST TO: Micro User Classifieds, FREEPOST, Macclesfield, Cheshire SK10 4YB.

Has upgrading your BBC Micro given you hardware you no longer need?

Or have changing interests left you with unwanted software?

This is THE place to advertise your surplus items.

Our 179,000 readers are always on the lookout for a bargain and this is the first place they'll look!

An added bonus!

Your advert will be automatically displayed on MicroLink, the electronic mail service. This means it will be seen by thousands of computer enthusiasts who can send an instant response.

(mains powered) £125. Super Art £25. Mouse £10. DMS Genie £35. Mega3 rom £40. View Professional £40. Beebug Master Rom £15 Phone 08444 4633 (Bucks).

● Microvitec colour monitor, small Ibico daisywheel printer, joystick, disc games, Micro Users (Feb '84 to Feb '89), Music rom. Offers! 0332 516853 (Evenings).

● BBC B, Issue 7, 8271 DFS 1.2, 40/80 track DS drive, 32k SWR, Interword, 12in B&W TV, books, 50+ discs, 70+ magazines, £300 no offers. Tel: 04574 5684 (Derbyshire).

● BBC B Issue 7, disc drive, data recorder, television, Watford rom/ram board, 20+ roms; Wordwise Plus, Dumpout 3, View, 100s games, joysticks, manuals, magazines. Bargain £375 ovno. Phone 0705 695787 after 7pm.

● BBC B Issue 7, two single 40/80T drives, green monitor, AMX Chip, mouse £320. Tel: 01-367 7027 after 4pm.

● Archimedes 310M colour, boxed as new, hardly used. Risc OS £900. Tel: 0530 416445 (eves).

● Acorn Teletext Unit with ATS, £60. Marconi RB2 Tracker Ball, £30. Tel: 041-357 0500 after 6pm.

● BBC B Issue 7, £250+ games, data recorder, all leads, cover, joystick interface, books, perfect condition, for quick sale only £170. Tel: 01-941 0958.

● BBC B Issue 7, Taxan Kaga, Cub Microvitec colour monitor, Wordwise. North London area £300 ono. Phone (Evenings) 01-203 7125.

● Master 128k colour monitor, 80T DS 5.25in disc drive, Digimouse, Pagemaker, Artroom, modem, £450+ of software, (many modern discs), joysticks, reference books, superb condition, £750. Tel 0703 732109 (Evenings).

● 6502 Second processor £20, colour Monitor £40, dual drives + discs £60, roms + manuals £25, software £20. Tel: 0705 523599 after 5pm (For BBC B).

● BBC B OS1.2 Solidisk DFS 1770. 32k sideways ram £195. Tel 0268 759268.

● WS4000 modem v21-23 AD-AA £70. Maplin 137MHz weather satellite decoder £60. Wanted, teletext adapter. Opus DDos version 3.45 £25. Two manual modems £20 each. Phone: 0264 62941.

● Archimedes 310M colour 9 months old. Pipedream Plus Spellcheck. Three Dabs Press manuals £750. Tel 0272 643109.

● Master 128 fitted with Turbo Board, Screen Dump, Viewstore, Quest Paint, Conquest, mouse. 40/80T disc drive, monitor, cables and all manuals. £450. 0279 39300 (Evenings).

● Master 128, 40/80T disc drive, Amber monitor, Mega 3, SpellMaster, Dumpout 3, Stoppress, Pascal, Mini Office, cartidges, games, manuals, joystick, magazines, £600. Professional printer stand, unused £10. Tel: 01-394 1001.

● Master Turbo, Dual 40/80T drives, green monitor, TV/monitor, Plinth, joystick, lightpen, mouse, Overview, Novacad, games, discs, tapes, manuals, £900 ono. Tel: 01-660 7207 (Evenings).

● BBC B Issue 7, Watford DDFS + disc drive, mouse, rom box, Interword, Sheet, View, Superart, too much to mention, £350 ono. Tel: 0834 811501.

● Archimedes 310 in very good condition with original box. Supplied with Risc OS and all manuals. £720 ono. Tel: 0886 21457.

● BBC B, DFS 1.60k, £100s worth of games and software £450. Ring 09277 67731 for full details.

● BBC B with disc drive, discs, joystick, books, games. £250 ono Tel: 0689 53355 Ext 5233(W) or 0959 63671(H).

● Psion Organiser Z-XP + extras £120ono. Phone 0580 893462 ask for Nick.

● BBC Master, colour monitor, disc drive, Panasonic printer, Teletext/TV adaptor, AMX III mouse + Superart, joystick, tons of software including Exile, Elite plus many accessories. Immaculate condition, offers around £650. Tel: 0274 674536.

● Canon PW-1080 printer, extra rom, leads, six months old, £140. Watford Electronics Quest, Conquest and Mouse £55. Latest Interbase £30, Technomatics 30Mb Winchester (ADFS only) only £350. Phone 0908 313916 (Evenings).

● Printer, KDC FT5001 (now Panasonic). Epson-Compatible £80. Wakefield (0924) 366503.

● Star DP-8480 dot matrix printer. Ideal for beginners, compatible with Wordwise (etc.). £60 ono. Tel: 0527 72732.

● Wanted: 40/80T drive with Acorn 1770 DFS for £80. Stephen Kay, 48 Corfe Crescent, Billingham, Cleveland, TS23 202.

● Wanted. Acorn 512k processor board. Tel: 021-556 7558 after 4pm.

● Archimedes 310 with colour monitor, Risc OS and 2-way BackPlane, boxed as new £750. Tel: 0202 696706 evenings and weekends, ask for Simon.

● BBC B 80T, DSDD drive, 1770 D/Interface, ADFS + DFS, Aries B32+B12, Viglen PC Console £300, Philips 12in Amber monitor £60, Mannesman Tally MT80+ printer £50, software worth £420. Tel: 0622 676340 after 7pm.

● Archimedes A440+ colour monitor, Risc OS, 1st Word+, Artisan, Orion, Zarch. £2,450 – nothing wrong with it, I'm upgrading(!). Tel: Peter 0622 676340 after 7pm or 0424 454257 daytime.

● Solinet BBC group. Supporting SW ram; sae. To 41 Westbrook Drive, Rainworth, Mansfield, Notts, NG21 0FB.

● Wanted Solidisk 1770+8271 DFDC. Tel: 0344 483244 Ext 2301.

● Archimedes 310 colour, mint condition + software + Risc OS £1,100. – also printer Panasonic KXP1081 £98. – buyer collects. Tel: 0706 817570.

● Watford rom/ram board, 80k, battery, £35. PMS6502 second processor £35. Digimouse £20. Wordwise Plus, Gxr, Advanced Basic, Pascal, Forth, Advanced Control Panel, Dumpout, Producer, roms. Phone 01-388 0392 after 7pm.

● Master Turbo (still boxed) with dual disc drives, games, manuals etc £550 0836 324767 after 7pm.

● Archimedes 310M colour system + Panasonic KX-P1081 printer + PC emulator + 150-Pascal + Twin Editor + Wordwise and all manuals: £980. 01-508 4992.

● Master 128 Turbo, twin 40/80 Pace disc drives, Panasonic KXP1081 printer, Acorn teletext adapter, rom and games software £550 o.n.o. Tel: 051 256 9438.

Ads will be accepted under the following conditions:

- This service is EXCLUSIVELY for the use of private readers. No trade ads will be allowed.
- To avoid encouraging software piracy, all ads will be carefully vetted before they are accepted.
- Ads can only be accepted on the form opposite (or a photocopy of it).
- There is no maximum to the number of words you include in your ad. If there is insufficient room on the form, continue on a separate sheet of paper.
- The cost is 20p per word, with a minimum of 10 words.
- *WE GUARANTEE your ad will appear in the next available issue of* The Micro User.

B B+ MM

Flick book generator

Mike Cook runs his thumb across an interesting idea

WHILE wandering around Elsinor in Denmark – you know, the place where Hamlet had his castle – I was delighted to see *The Micro User* on sale in the town's main newsagents. Just outside the town is Denmark's technical museum where I saw a collection of ancient photographic equipment. Also on show was a collection of flick books and the idea suddenly clicked – or should I say flicked – why not a micro-generated flick book?

After all, a flick book is just a collection of drawings differing slightly from each other. To draw one by hand is slow and tedious, but a micro thrives on tedious repetitive tasks so it should be the ideal solution. Additionally, although flick books are generally considered childrens' novelties, I began thinking that maybe they also had some useful applications. The modern micro with its graphic facilities can be a blackboard showing all sorts of moving systems with animated diagrams. However, the problem in a class situation is that once you have shown an animation, it is difficult to set up the demonstration again. With a flick book each student could take home his own copy of the animation. Play it when he wanted, forwards, backwards and freeze frame whenever it suited. In short it would be on hand when needed.

The idea is to develop a program that will draw a series of images, then print out each frame which can then be photocopied, if necessary, and bound into a book. The major problem here is printing out the picture: While many commercial screen dumps exist they are designed to print single screens rather than a whole series.

Problems need to be divided up so each frame occupies a quarter of a Mode 4 screen. Then we need a printer dump that will print each frame along the width of the paper to give 12 frames per sheet – the idea is shown in Figure I. The dump routine also needs to outline the frames for cutting and leave a margin at the top for binding.

Listing I is the source code of the dump routine and assembles it into memory at &A00. It is written for Epson-compatibles. However, it can be modified for other types capable of producing 640 dots across the paper. Some printers need different control codes to set them up to receive 640 dots, and these are placed in the subroutine at line 620.

The reason for choosing 640 dots is that this is exactly the number of pixels needed to dump two Mode 4 screens side by side. Also this dot density produces the correct aspect ratio on most printers, although the Epson LQ500 may give slightly elongated results.

When the dump routine is installed in memory the program in Listing II can be run. This is the outer shell of the program and supervises the drawing operations. The drawing is carried out by the procedure PROC_DRAW, which has just one parameter – the frame number. If you look at Listing II you'll see that this procedure is not present.

The idea is simple, when you are developing a new flick book, first load in the shell (Listing II) and then add a draw procedure, which needs to be written independently. Once it has been developed you can save the whole program to disc using an appropriate name.

The shell sets up different areas of the screen for the draw procedure to use. It does this by setting the origin and defining a window for each of the four frames produced on the screen at one time. Thus the draw procedure need not concern itself with where the picture is going to appear on the screen, as it simply works in an area which is 640 by 512 – half the normal coordinate range.

Listing III is a simple draw procedure to produce a number of diamonds – you can add this on to Listing II for a complete program. When it is run you are first asked how many frames you want to use. This will set the total length for the flick book – 60 pages is about right for most. However you might like to look at the result quickly on the screen before you commit anything to paper, so select 12 to start with. You are then asked if this

is a test or to be printed. Type T to indicate a test. You will then see the first four frames on the screen; pressing the spacebar reveals the next four, and so on. The draw procedure uses the variable *FL%* – frame limit – to find out how many frames there are. This is a global variable from the shell and should not be changed by this procedure.

When you are satisfied with the drawings you can use a large number of frames and send the results to the printer. You will notice that the draw procedure prints the frame number in the corner of each picture. This is not essential but is quite handy when assembling the flick book.

Now printing out 60 frames, 12 to a page, will give you five pages of printout. Carefully cut along the dotted lines so that each frame is separate, but do not cut across the solid line at the top of each as this is the margin used for binding. Arrange all the pages in the correct order, hold the top between your thumb and forefinger and have a small flick. You should now see that the animation is correct. If it is not, the pages must be in the wrong order.

Now you have to bind the book so that it can be used permanently. Take the stack of pages and wrap it round completely with what Blue Peter viewers know as self-adhesive tape. Make sure the Sellotape is level with the line across the top of the frame. You will find that it protrudes over the end of the book.

Now take some PVA wood-working adhesive – the white sort – and flood the edge of the book with a thick layer – the tape will act as a retaining wall. Let it dry, preferably overnight, and keep the flick book in the upright position, this can be done by resting it between two books. When dry the adhesive will become translucent and the excess Sellotape can be trimmed.

Your flick book is then ready for its public performance. I've found that standard continuous paper tends to lose its rigidity and acquires a curl after a lot of use, but if rested the paper regains it's original springiness.

Now let's see what other movie classics we can generate. Listing IV shows the transformation of one shape into another. What we have to do is define two shapes and let the micro calculate all the inbetween frames. When the flick book is made one shape will transform itself into another. We need to add Listing IV to Listing II in order to produce the book.

The two shapes are defined in the data statements. The format is simple – each pair of numbers represents coordinates and successive pairs are joined together by lines. The coordinates 0,0 are used to indicate that a new line should be started. When the shape is finished the coordinate pair –1,–1 is used.

The only restriction about the shape is that each should have the same number of lines and corresponding ones in the shape and each should have the same number of points. This might appear a hefty restriction at first, but it can be circumvented.

The two shapes in Listing IV are a star which needs nine points and a square that has five – remember the start and end point are the same place but still need to be entered. What we do in

Turn to Page 108 ▶

Mixing and matching

The checksums for each part of the program have been created independently so to use them each listing must be typed in by itself, saved and then checksummed. To add the various draw routines to Listing II you should load the one you want then type:

```
*SPOOL DRAW
LIST
*SPOOL
```

Now load Listing II and type:

```
*EXEC DRAW
```

and the draw routine lines will be added.

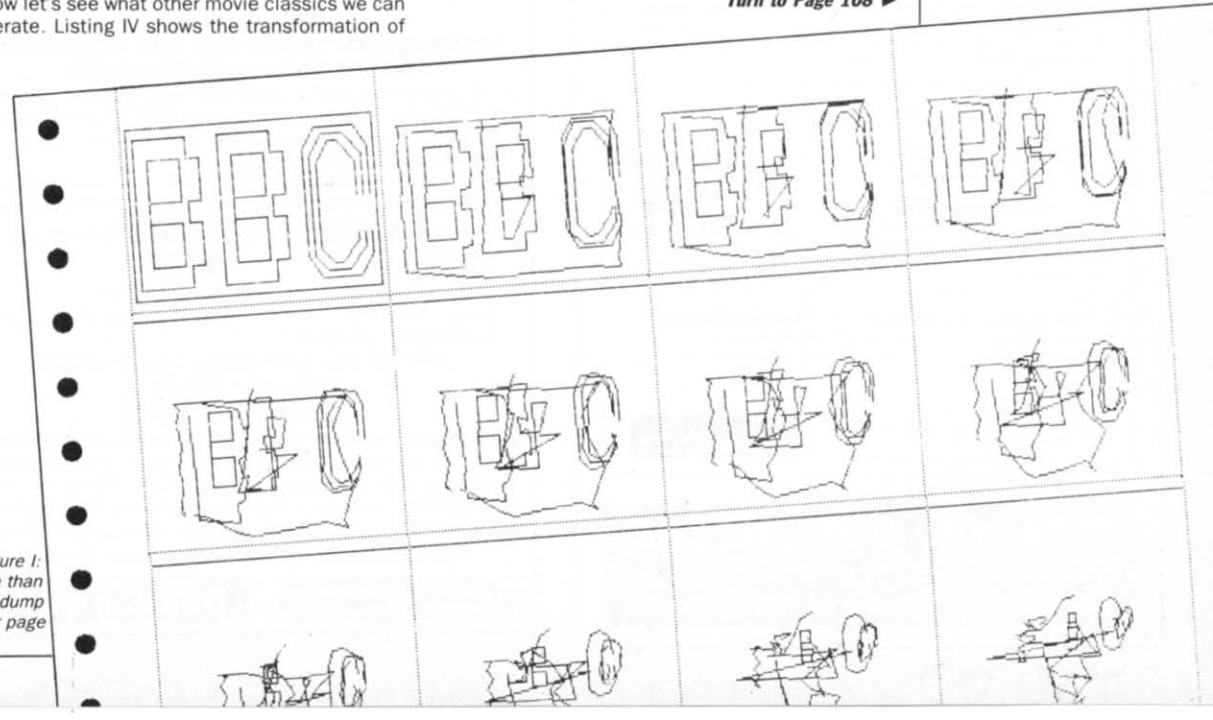


Figure I: More than one dump per page

◀ *From Page 107*

the line of fewer points is to add dummy ones; here they are the mid points of the line. Where this is more difficult to calculate, you can simply repeat coordinates in the shorter line.

It is best if you draw your own shapes on graph paper first and then read the points from this. The procedure works by reading all the points into an array – make sure it's big enough to take them all by altering the DIM statement in line 1190. It then calculates a point to use in the drawing that is a fraction of the way between the two that makes the start and end shape.

The fraction used depends upon how far the frame number is advanced compared with the total length of the flick book. For example, if we are halfway through the book, the point used to draw the line will be halfway between the position of the point on the starting shape and that of the ending shape.

Listing V contains new data for Listing IV, which defines the shape of the letters BBC and a picture of an owl. For best results run this with 120 frames and watch a complex picture emerge from the initials.

You might like to play about with the lines: By putting them in different orders you can get different intermediate messes. It is quite fascinating to watch the letters dissolving into a mass of lines and then miraculously a picture emerging from them. Of course you can run the movie backwards simply by flicking the book the other way.

There is a serious side to flick books: I remember learning all about transverse waves and longitudinal waves in school – this is basically the two different ways a wave can propagate through a medium – and to illustrate these two types of propagation I have written two draw procedures for the flick book shell. These are shown in Listings VI and VII.

The first is the transverse wave, where each particle in the propagating media moves at right angles to the direction of the wave. This is illustrated by numbers – you can see each move up and down, but the result is a wave that moves from left to right.

In Listing VII a longitudinal wave is illustrated by a number of straight lines which move backwards and forwards as the wave moves from left to right. The beauty of using flickbooks to illustrate these waves is that they can replayed quickly when needed to reinforce the concepts.

There are many more examples I would like to produce for the flick book but space does not permit. How about sending in your favourite drawing procedures or data statements of transforming shapes and we'll publish the best of them? Until then, happy flicking.

Turn to Page 122 ▶

NOW FOR RISC OS

A LOW COST DISC BASED

PROFESSIONAL ACCOUNTING PROGRAM

"MICRO-TRADER"

INTEGRATED SALES PURCHASE AND NOMINAL LEDGERS

Turn any BBC Computer from the humble Model B to the latest Archimedes into a fast, powerful business tool. "Micro-Trader" can provide easy to use and timesaving computer accounts for businesses with a turnover up to £21 million per year.

Designed for business use by a business man, "Micro-Trader" offers full Sales and Purchase Ledger facilities including SALES INVOICE and STATEMENT PRINTING with a capacity of up to 1,000 accounts and 5,000 transactions per month.

Nominal Ledger features a quick and easy entry of everyday transactions. Up to 6 Bank Accounts, full V.A.T. facilities, Journal Posting, Full Reporting for individual accounts, Audit Trail, Trial Balance, Profit & Loss and Balance Sheet.

"MICRO-STOCK"

Stock Control program, fully integrated with "Micro-Trader". 4,000 Stock Items with user defined Codes. Invoice and Credit Notes and Cash Sales routine. Full Stock Held Reports.

£75.00 + V.A.T.

ONLY £200 + V.A.T.

"EXTENDED PAYROLL"

Micro-Aid Full Feature Extended Payroll. For use stand alone or integrated with "Micro-Trader".

£49.95 + V.A.T.

"MICRO-MAILER"

A Mailmerge program, fully integrated with "Micro-Trader". With a user Database.

£30.00 + V.A.T.

ARCHIMEDES

Improved program for RISC OS features faster searches, larger capacity and improved analysis facilities.

Archimedes

PHONE TODAY FOR A FREE FACT SHEET

MEADOW COMPUTERS

11, LONDON STREET, WHITCHURCH, HAMPSHIRE, RG28 7LH

Telephone: Whitchurch (0256) 892008

AMPSOUND

153a Victoria Street St Albans Herts AL1 3TA

Specialists in Archimedes, Software & Sound-Related Peripherals

Archimedes A3000 to 400 series Machines - Now Available

NEW MIDI SOFTWARE FOR THE ARCHIMEDES

'!INSPIRATION' MIDI SEQUENCER

★ Unlimited tracks stored onto 'reels'/reels can play concurrently ★ Fully compatible with RISC OS and A3000 ★ Works in all screen modes ★ Min 1mB memory required ★ And launched at the British Music Fair:

PMI4 - Professional MIDI interface for the Archimedes

"INTEGRATE" - Matrix manager package for PMI4 interface

ARMADILLO 8/16-BIT SOUND SAMPLER

8-bit	16-bit
Mono...£130.00	Sound sampler
Stereo...£160.00	Special launch price...£1100
Stereo+MIDI...£190.00	

DTP for the Archimedes now available - Ring for Details

ABOUT AMPSOUND

Advice before you buy and back-up after-that's our business. We supply all leading equipment at competitive prices. So if you need help with computers, software, DAT, CD-players, Audio tape, cabling/connectors, mixers, microphones, Patch bays in fact just about any audio accessory around - then just give us a call.

Full Product/Price list available on request.

Prices exclude VAT
Cheques/Access accepted

0727 50075

B B+ M

Programmers' Challenge is a series of articles to let you exercise your programming skill at any level. It comes in three parts: The challenge, some hints and the solution.

In the Challenge I outline a problem for you to solve using your micro. This contains all the information you need to write the program. If you are a reasonably competent programmer you will need no further help. However if you are just beginning you might not be able to sort all of it out. Nevertheless, thinking about the problem and trying out a few ideas will help you develop your skills. What you need is the next section: Hints.

Here I set out an algorithm you can use to code up the problem. An algorithm is simply the method you are going to use to implement the solution. It should be relatively straightforward to convert into a simple program providing you are familiar with the language.

Finally, in the solution I will give you a simple, no frills program that does the job, along with suggestions for further improvement. You can check this against your own solution and perhaps sort out any points with which you had difficulty.

Remember, as far as a program is concerned, there are as many right answers as wrong ones, but the solutions I favour are simple, straightforward and readable. I will avoid as much as possible using fancy tricks or so-called clever programming techniques, as most of the time they simply are not necessary.

Programmers' Challenge

Mike Cook has you going round in circles with the first part of his latest brain teaser

ONE of the joys of parenthood is that you get asked all sorts of questions. Take the other day while I was cooking a meal. Small boy looks in the pan of boiling potatoes and announces: "Water is very clever, isn't it?" When asked to elucidate, he explains: "It's the way all the drops on the lid know how big to go without touching the others".

Physics aside, he had a point, which got me thinking of how to draw the same thing on a screen. First we need to draw a circle. For those of you with an Archimedes that's not too difficult using the circle command – and if you've a Master you can use a specific PLOT number.

It's not too much of a problem for the rest of us either. We can describe the circle in terms of polar coordinates as an angle and a radius, and step the angle round through 360 degrees. But how do we make sure that no two circles overlap?

Well, remember Pythagoras from school? I seem to recall it was something about American Indian women: The squaw on the hippopotomas hide was equal to the son of the squaws on the other two hides, or something like that. We can use this relationship to make sure that no two circles overlap.

What we need to do is to record all the circles we have drawn, that is the coordinates of the centre and the radius. Then generate a new centre and radius at random and search through our list of previously drawn circles to make sure the new one does not overlap.

If it does not we can draw it and add it to our list otherwise we discard it and generate another one. In this way the screen will fill up with circles which, just like the condensation on the pan lid, do not overlap.

● *Well have you enough to go on? I challenge you to write the program. See you next month with some hints and the month after with a solution.*

"Over three years after it was first released, Wordwise Plus is STILL the most powerful word-processing system for BBC B and Master."

Quite a claim!?... but we at Norwich Computer Services have the know-how and products to back up that claim!

The unique programming language of Wordwise Plus allows you to "bolt on" extra facilities which extend its capabilities way beyond what you might have thought possible.

The Complete Wordwise Plus Handbook

by Paul Beverley (420 pages, A5, wire bound)

The **definitive** book about Wordwise Plus. Includes editing techniques, document layout, how to use different printers, how to start using the programming language, advanced programming techniques plus a huge range of ready-to-use applications programs including:

- Auto paragraph numbering
- Index geperation
- Handling address lists (inc. label printing)
- Automatic file saving with back-ups
- Decimal tabulation
- Transferring files with View
- Multiple copies of documents
- Auto-preview program
- Creating multi-columns
- Etc etc (over 60 programs in all.)

~~£17.50~~

(To clear) £8

(This offer is strictly limited – while stocks last.)

Word-Ex

~~£30~~

£23

"...the best support package yet published for Wordwise Plus users", said Jonathan Evans in a review of Word-Ex 1.0 in A & B Computing. Since then it has had several major additions to its facilities. Amongst the main facilities provided by this ROM are:

- Menu-driven file access (as per Interword)
- High speed sorting (alpha/numeric, up/down, case sensitive/insensitive, lines or paragraphs, optional sort on surnames)
- Label printing – 1, 2, 3 columns, allows comment lines
- Function key editor – forget those funny codes – just press the keys you want it to copy

Extra keyboard commands:

- Fast word-search
- Delete line
- Mark paragraph
- Mark line
- Goto segment n
- Transpose characters

The Continuous Processing ROM for Wordwise Plus (CP-ROM)

Forget all those problems of losing 80 column preview on large documents. CP-ROM allows you to handle documents of unlimited size with ease. Page-numbering and all global formatting is taken care of, allowing you to concentrate on what you are actually writing.

CP-ROM 2 (DFS only) ~~£25~~ **£18**

CP-ROM 3 (All file-systems inc. Econet) ~~£30~~ **£23**

Handbook Program Disc

A program disc is available with 57 of the programs from the Complete Wordwise Plus Handbook. Save yourself typing in the program listings and wasting time having to debug any typing errors. ~~£7.50~~ **£5**

Please specify 40 or 80T.

Other Disc Software

In addition to the programs in the Complete Wordwise Plus Handbook, we have over 20 programs for a wide variety of applications. The idea is that each application is on a separate disc ready to "plug in and go". These include:

- Mail-merge
- Script-writing
- Multi-columns
- Address-handling
- Foot-noting
- Special printer effects

From £4

All these and more are available by mail order from:

Norwich Computer Services

18, Mile End Road, Norwich, NR4 7QY.

☎ 0603 - 507057

All prices **include** VAT, where applicable, and are sent UK post free.

Sorry, no Credit Cards, cheques only – it keeps down the costs and so keeps down the prices.

Arm can lend a hand when you're upgrading

I HAVE been a prolific and contented user of a BBC B for many years and would have every intention of continuing in this happy state for many more to come.

But I am continually being told by dealers and colleagues in the industry that the poor old BBC Micro has had its day, that it is now obsolete and has been superseded by other and better machines. My question is what machines?

I require three harmonic voices and more if possible, which would seem to rule out the IBM PC and its clones. I don't particularly need advanced graphics, though if I had such a facility I would probably amuse myself with it for a little while.

What I am looking for is a much better disc filing system than the 31 file seven character name system I have at present and, despite having the Aries memory extension board, I would like a litte more than my present limit of about 26k ram.

I am also interested in adding a hard disc drive, to increase the number of files visible at any one time without the need for disc swapping.

It is very important that I find an upgrade on to which I can transfer my data files and which can run my existing software, written mostly in Basic with a small amount of assembler, without making extensive changes.

The Master or Archimedes do seem obvious choices, but again I hear dealers making discouraging noises, saying: "It's still Acorn though".

So tell me, where should I go and how should I spend my money wisely? I use my machine primarily for word processing, with comms and music printing. All I really need is a compatible upgrade and continuity without upheaval. After all, the BBC Micro is still an excellent machine. – **Colin M. Johnson, Hythe, Kent.**

● In some ways your requirements cancel out your choices. As you've discovered, adding shadow memory gives you the maximum of 27k main memory but changing to a Master won't help – the extra 64k won't be utilised by your software, but you will be able to use ADFS.

The Archimedes machines have more ram, eight sound channels, ADFS and are upgradable or contain a hard disc. But your 6502 code won't work except on one of the 8 bit emulators which are slow and once again restrict you to 27k.

However, all is not lost. If you upgrade to the 32 bit machine you can convert your 6502 code back to Basic and it will probably run fast enough for your needs. Indeed, Arm code is similar to 6502 in many ways and very easy to learn, so perhaps this type of conversion would be suitable.

£10 Prize letter

Further into fractals

I READ your article about fractals in July's issue of The Micro User *and found it very interesting. However, there seem to be two errors in the rules given to experiment with:*

☐ In the Peano Curve, the rule for X should be XFYFX+F+YFXFY-F-XFYFX.

☐ In the Dragon Curve, the rule for Y should be FX-Y.

Also the main program can be improved by adding the following lines:

```
1060 Nx=(MaxX-MinX)/1276
1070 Ny=(MaxY-MinY)/1016
1080 SX=(SX-MinX)*Nx
1090 SY=(SY-MinY)*Ny
1091 SFx=Nx*SFx
1092 SFy=Ny*SFy
```

which works out the correct screen size after just one execution, instead of two – maybe saving quite a bit of time as well.

Here are some curves I designed myself:

☐ Squares
Start angle=90
Turning angle=45
Axiom=S
Rule for S=[G+G+S]H+[G+G+S]H+[G+G+S]H+[G+G+S]H+
Rule for F=FF
Rule for f=ff
Rule for G=f
Rule for H=FFFF

☐ Sierpinski space filling curve
Start angle=-270
Turning angle=45
Axiom=S
Rule for S=L+D+L+D+L+D+L+D+
Rule for L=L+L+L--E--L+D+L
Rule for D=FFF
Rule for E=FFFF

☐ W curve
Start angle=0
Turning angle=90
Axiom=S
Rule for S=L+F-F+L+F-F+L+F-F+L+F-F+
Rule for L=L+G-G+L-F-L+G-G+L
Rule for G=F

☐ C curve
Start angle=-270
Turning angle=-135
Axiom=TF
Rule for F=FP--F
Rule for P=P++
Rule for T=T+

I hope these will be of interest. – **Douglas Boffey, Halewood, Liverpool.**

● A couple of signs were missed from the rules printed. You are correct in putting the minus in the Peano Curve formula, but in the Dragon Curve a plus was missed off the rule for X, which should be:

```
X+YF+
```

Win a tenner

● **Want to write to The Micro User? The address is: Letters, The Micro User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

Writers of the most interesting letters receive a £10 prize.

Expert debugged

THERE is a very minor bug in Table Expert from the June issue of The Micro User.

The problem arises when incorrect answers are given for two multiplications, and the correct response for the first is greater than 10 while the right reply for the second is less than 10, meaning the second correct answer fails to completely overwrite the first.

It is easily overcome by adding the following to the end of line 1840:

```
;SPC(1)
```

– **Maurice D. Hodges, Tiddington, Dunstable, Beds.**

● You're quite right – it's one of those little errors that are so easy to miss.

Strictly for the birds

SHEILA Hall, the keen bird watcher who wants to put her records on a micro, may be disappointed with Bird Spy from BBC Soft as mentioned in the June 1989 edition of The Micro User.

The program, which is excellent in its own way, is designed to be used with

Turn to Page 112 ▶

◀ From Page 111

observations of birds coming to and going from bird tables. I assume that Sheila would want to record more than this.

A database would be useful, although again limited in its application. It really does matter what you intend to record. It would take time to set up even a simple database with fields for:

```
Name of species:
Where seen:
Date seen:
Male:
Female:
Immature:
Status:
Weather conditions:
Sighting confirmed by:
```

It would be fairly straightforward to do this on most databases and produce separate files for a life list, own area list, holiday lists and anything else of interest.

It's important to check the number of records the software you're going to use will hold – I have used Masterfile II successfully recording birds observed by schoolchildren.

If Sheila wants to do anything on the lines of counting the number of birds observed on visits, the use of a spreadsheet can be an invaluable aid with the species down one side and dates along the top.

It pays to take some time to work out what you want to record, because once you get into listing large numbers of species in detail you can get into all sorts of trouble with space available and the amount of memory on the BBC Micro. – **Alan Clamp, Failsworth, Manchester.**

ALL programs printed in this magazine are exact reproduction of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency. Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we can no longer answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

Two Beebs made better

THANK you for printing my letter – Two Beebs are better than one – in the June issue. Unfortunately line 40 of Program I was incorrect: It should read

```
40 *FX2,1
```

This causes the GET command to fetch characters from RS423 at line 60. – **Nigel Barrett, Prescot, Merseyside.**

Adventurous Archimedes

I AM developing an adventure for the Archimedes and although I have not yet started entering things like the locations I have written a number of routines to deal with text compression and inputs. They are in Basic but I feel are quite adequate for the job.

I hope to use a compiler once I have finished to make the game run more smoothly and quicker. Although I feel this adventure will be good – and hopefully of marketable quality, but I have a long way ahead of me yet.

I would feel happier if it were a graphical adventure and not solely text, but I have a problem. I know that sprites take up large amounts of memory – which is valuable for producing a good adventure – and if I incorporate graphics I will have wasted the advantage I have gained from using a text compression program.

I have heard of a technique from compressing graphics – used in Clare's Render Bender called Delta Compaction and if I could use this for compressing sprites in my adventure it would make a graphical one easier to produce.

Please could you tell me if you know where I could get a program solely for compressing graphics and re-expanding them? – **Max Palmer, Rutland.**

● Delta compaction is fine for sequences of similar pictures because it stores differences rather than complete scenes. This wouldn't be applicable to an adventure.

An Archimedes screen compaction technique was published in the October 1988 issue of *The Micro User* for complete screens. You could modify this to display individual pictures and partial screens.

Checksum discrepancy

IN the June edition of The Micro User there is a type in game called 5 Alive. After typing it all in, I ensured it was right using the checksum program – machine code version from February 1989.

I noticed that line 40 of Listing II was making the checksums incorrect. It said the following:

```
40 DIM H%(6),V%(8):*LOAD DATA
```

But line 90 of Listing I – the data creator – contained:

```
90 *SAVE XDATA
4F00+900
```

Shouldn't the filenames be

Dealing with the taxman

I WOULD like to comment on Jon Revis' review of accounts packages which appeared in July's issue of The Micro User, in particular Taxman. I would expect a reviewer to familiarise himself with a package before commenting on it, even if it is a bit unfriendly for the newcomer.

The program was developed over a period of two years and was written with the purpose of cutting out the author's accountant. For the small businessman who is prepared to take some trouble to learn how to deal with his own tax affairs, Taxman can save the fee that the accountant pockets.

The author, Bob Allan, is a friend of mine and I have acted as a test bed for Taxman. I sacked my accountant three years ago on the strength of Bob's program. I now save myself about £600 a year and take up less time than when I used an accountant.

Had the review been conducted correctly Mr Revis would have discovered that the presentation of the printout is just what the tax inspector wants – in fact my tax office has commented favourably about it.

From the BBC B I now use it on my Archimedes which, despite the fact that for the purist it is badly written, neither my Archimedes nor bank manager complain.

To sum up, Taxman is not friendly until you learn how to use it. You will then see its advantage: It produces a trading account, capital allowance computation and schedule of fixed assets as well as calculating the tax and NIC due. Taxman was not designed to do the job of the other two packages. – **Stan Marshall, Newquay, Cornwall.**

● We have no doubts that Taxman does the job for which it was intended. However, the unfriendliness of the program will prevent many people getting very far into it without giving up.

It's a pity that such a potentially useful piece of software is ruined by a poor user interface.

the same? After altering these lines, I checksumed lines 2920, 2940 and 2960 of Listing III:

```
2920 - - Tune 1
2940 - - Tune 2
2960 - - Tune 3
```

The checksums for these were:

```
2920 = 5956 7
2940 = 6965 E
2960 = 7914 2
```

but mine read:

```
2920 = 5956 6
2940 = 6935 8
2960 = 7914 C
```

Overall I found the game brilliant. Here's my evaluation along with Mike Goldberg's other game, Skulls, from the February 1989 issue:

```
5 Alive
Sound            10
Graphics          4
Playability       4
Addictiveness    10
Skulls
Sound             7
Graphics          8
Playability       8
Addictiveness     9
```

I must congratulate him on his super programs. – **Stephen Scott, Englefield Green, Surrey.**

● The checksums themselves do match the published listing – although you're right about the data filename. A development version was printed where we had changed the name to prevent accidental erasure of the correct data file.

The filenames should be the same but, providing you are consistent, you can change them both to anything you want.

As you say, your checksums for lines 2920 to 2960 match the ones published – but remember, only the first four digits refer to the current line. The fact that the last one is different shows that you have a discrepancy earlier in the program.

As Basic is an interpreted language, lines are only acted on when control reaches them, so you can put anything you want in a line – with or without a REM – providing the program never tries to execute it.

Master roms socket snag

I HAVE a Master 128 and have bought the Dumpmaster screen dump rom from Beebug. It would only work when inserted in the middle of the Master's three rom sockets. Having recently bought Spellcheck III, I have encountered the same problem,and the only way to use Spellcheck is to unplug the Dumpmaster rom from the middle socket and replace it with the Spellcheck one.

Is it normal that I can only use the middle socket, and if not is there any way of overcoming the problem? – **Adam Wall, Lightwater, Surrey.**

● The Master can take up to nine roms in positions zero to eight:

Rom	Location	Size
8	internal	16k
7	Internal	32k
6	Internal	
5	Internal	32k
4	Internal	
3	Cartridge	16k
2	Cartridge	16k
1	Cartridge	16k
0	Cartridge	16k

Rom eight is the middle one of the three you've mentioned. The other two are roms seven/six and five/four which will take either a 16k rom or a 32k one.

However, the two internal 32k sockets – roms four to seven – can also be switched to be four banks of sideways ram which is already plugged in to your Master.

Currently your machine has the links set up so that the two 32k sockets are not in use, and instead 64k of sideways ram is available.

If you use the sideways ram – or have games that do – your best option is to buy a cartridge and plug your extra rom into that and then insert it into your machine.

To switch from sideways ram to internal rom socket you need to alter either link LK18 or LK19 which affects the socket it is closest to.

Printing tips

MANY thanks for printing David Watts' letter – It's all Greek to the printer – *in the June edition of* The Micro User. *It follows on well from Peter Harris's article,* Join the View Club *(September 1988).*

Peter explained how highlight two can be used for Escape codes by using the edit command HT 2 27. This works fine for single letters or digits, but is no good for others like backspace, for example, which needs the sequence Escape BS.

The printer will accept the first letter, B, as a non-existent code and then print the second, S, in the normal way. However, highlight one can be used for backspace as in Figure IV of this article.

It is rather cumbersome, especially as View is not a wysiwyg language, but David Watts' method can be used for adding umlauts to vowels in German, even though the daisywheel of my Juki 6100 has no umlaut available . Turn the printer into graphics mode, and print two full stops for the umlaut as follows:

```
Bl*3a*-*-*-D.  .*U  *4tter,
```

*This prints Blätter. Note that * is used to replace highlight two and – for highlight one.*

Escape 3 is the code for graphics mode, cancelled by Escape 4. Escape D is the code for a half-turn of the platen, so that the full stops are printed up in the air and Escape U reverses this process, bringing the rest of the word level again. Note that two backspaces – each 1/120 inch – equal one forward space – 1/60 inch.

The same procedure can be used in a Basic program using the VDU1 command and Ascii numbers. For example, VDU1,27,1,8 produces a backspace. This was explained by Peter Noble in his article Power to your printer *back in March 1987.*

There is, however, one problem which David Watts does not mention, perhaps because it does not arise with his Greek alphabet. It is impossible to start a fresh line of text neatly with an umlaut over a letter, because one of the full stops needs to be backspaced slightly into the left-hand margin. This minor inconvenience can be overcome, if need be, by a judicious setting of rulers. – **S.A. McCoy, Wollaton, Nottingham.**

Playing the generation game

I DO a lot of word processing, mainly on Wordwise Plus, and although it's a good program it sometimes crashes. Keeping backup copies is always a good idea, but somehow you never seem to get round to it.

However there's a really quick way of keeping up to seven generations of files. Give the file you're working on a single letter name – A – type for a little while, then enter the save option.

Wordwise Plus gives you the name of the program, so copy it and add a +. Then continue typing again and perform the process again and again copying the old filename and adding another +.

Eventually you get to the filename length limit. At this point just copy the letter name and start all over again.

*When you restart work next day perform a *INFO command and the longest file should be the last one you were working on and you can continue from there.* – ***Peter Lee, Stockport, Cheshire.***

CHECK OUT OUR PRICES! AND NO UK CARRIAGE CHARGES

DABHAND COMPUTING

A3000 ..... £599
A410/1 ..... £1099
A420/1 ..... £1599
A440/1 ..... £2399
RISC OS In stock *still at* ... £29

Also every machine comes with free BASIC Compiler, and Alerion or Arcendium game pack.

Archimedes Starter Pack - consists of mouse mat, dust covers for computer and monitor, 10 discs in plastic box, ArcKey function keystrip pack, and keyboard extender cable £39.95

9-PIN PRINTERS (free lead)
Panasonic KX-P1081 ..... £149
Panasonic KX-P1180 (1124 style case) £199
Star LC-10 (Cheapest 9-pin with Sh.Fdr.) . £169
Star LC-10 Sheet Feeder £69

24-PIN PRINTERS (free lead)
Panasonic KX-P1124 (the best!) £265
Sheet Feeder for above £99
Star LC24-10 ..... £269

COLOUR PRINTERS (free lead)
Star LC10 Colour £199
Colour labelling software (Arc) £29.95
Colour labelling software (BBC) £24.95
Integrex Colourjet 132 ..... £509
HP PaintJet £795

INKJET AND LASER PRINTERS (free lead)
HP Deskjet (Inkjet HP compat.) £625
Sharp JX-9300 Laser (HP compat.) £925
Qume CrystalPrint HP Version £1395
Qume CrystalPrint PostScript Version £2895

Other models available at generous discounts. Serial options, sheet feeders etc.- just ask.

TERMS: UK residents add 15% VAT to all prices, except books but **delivery FREE on all items in the UK**. Export, no VAT, carriage at cost. quotations available). Europe maximum £2.50 software, £35 hardware. Access/Visa/Style cards accepted by post/phone/in person. We are authorised Acorn dealers. Official orders accepted from public sector/PLCs, otherwise cash with order. Tender invitations welcome. Callers welcome. We are about 800yds north of J 17, M62. Fax: 061-766 8425.

DABHAND COMPUTING LTD
5 Victoria La., Whitefield, Manchester M25 6AL

061-766 8423

DTP

Acorn Desktop Publisher NOW IN STOCK

BBC MICRO SOFTWARE
HyperDriver printer driver £26.04
MiniDriver (for Mini Office II) £21.70
MOS Plus ROM £11.26
Fingerprint machine code monitor £8.65
SideWriter pop-up notepad £6.91
Master 512 Shareware Vol. 1 ..... £26.04
Master 512 Shareware Vol. 2 ..... £26.04
OverView £81.70
ViewSheet, ViewStore ..... (ea.) £49.40
ViewPlot £24.73
ViewIndex £12.35
ViewSpell £33.00
BBCBASIC(86)+ for M512/Arc PCE £74.95
All Acornsoft, CC, etc. ..... 5% discount

BOOKS (no VAT)
VIEW: A Dabhand Guide £12.95
Master Operating System £12.95
ViewSheet/ViewStore £12.95
C: A Dabhand Guide £14.95
Mini Office II: A Dabhand Guide £9.95
Master 512: A Dabhand Guide £9.95
Mastering Interp. & Compilers £14.95
Archimedes Assembly Language £14.95
Archimedes Operating System £14.95
All above Dabs Press books have accompanying disc - add £5 for 5.25", £7 for 3.5"
BASIC V: A Dabhand Guide £9.95
Assembler Bundle ..... £4.95 (inc. VAT)
Arch. Programmers Ref. Man. £29.95
Master 128 Ref. Man.Pts1&2 ..... (ea.) £14.95
New Advanced User Guide £19.95
Mastering Interpreter & Compilers £14.95

SPECIAL OFFER

STAR LC10 COLOUR

£199

While stocks last

ACCESSORIES/MISC Ask on other items
Master EPROM Cartridge £10.95
Master Universal CoPro Box £49
Econet Module £49
512 DOS+ Econet Version £149
BBC B 1770 disc upgrade £49
Model B/B+ User Guide £10
Miracom WS3000 Modem V22bis £339

CONSUMABLES
5.25" Floppy Discs (10 in plastic box) £4.35
3.5" Floppy Discs (10 in plastic box) £8.69
5.25" Discs (100 in lockable box) £43.47
3.5" Discs (100 in lockable box) £86.91
A4 paper 500 sheet pack £2.95
2000 sheets of listing paper £15.00
Printer ribbons (all makes) ..... CALL
Laser Toner Cartridges ..... CALL

OTHER COMPUTERS
Psion Organiser CM £69
Psion Organiser XP £99
Psion Organiser LZ £129
Psion Organiser LZ64 ..... £169
Psion PC Comms Link £59.95
Z88 32k Portable Computer £195
Z88 All-in-one Pack £239
128k RAM cartridge £41.26
32k EPROM cartridge £16.48
BBC Link £20.61
Z88 SpellMaster £56.95
Mains Adaptor £8.65
All Psion/Z88 accessories and s/ware available

ARCHIMEDES BASE UNITS
Archimedes A3000 ..... £599
Archimedes A410 ..... £1099
Archimedes A420 ..... £1599
Archimedes A440 ..... £2399
Archimedes A310M £899
Archimedes A3000 Monitor Stand £29
Archimedes A3000 Serial Upgrade £19
Archimedes A3000 User & Midi Podule £46
Second 3.5" drive £109
External 40/80T 5.25" incl. Arc interface ... £149
A310 4-slot backplane £59
A310 Official 20Mb Hard Disc upgrade £449
400 series RAM expansion (per 1Mb) £189
400 Official Hard Discs ..... CALL
Computerware 20Mb HD (A310) £379
Computerware 20Mb HD (400 series) £199
I/O Expansion Card £79
RISC OS (available from stock) £29
Arc Modem Lead (correctly wired!!) £8.65
Keyboard Extender £8.65
Mouse Extender £8.65
Virtually all other leads ..... £8.65 or less
Arc Dust Covers £9.95
All Archimedes computers come with free ABC Compiler, Alerion or Arcendium game.

MASTER COMPUTERS
Master 128 ..... £399
6502 Turbo Co-Processor Board £109
BBC Dust Covers £9.95
Substantial educational discounts available on Master 128, A3000, A310, and A410.

BBC CUMANA DISC DRIVES (All 40/80)
Single Drive without PSU £109
Double Drive without PSU £199
Extra for integral power supply unit £20

MONITORS (Free Arc or BBC lead)
Acorn (Philips) Mono £79
Acorn (Philips) Colour £199
Philips CM8833 Stereo £229
Taxan 770+ MultiSync (superb quality) £449

ARC SOFTWARE
ANSI C Compiler + free C book £99.00
PC Emulator + free PCE Shareware £99.00
Arc PCE Shareware Pack Vol. 1 ..... £34.39
Arc PCE Shareware Pack Vol. 2 ..... £34.39
ABC Compiler (Version 2) £86.91
Alerion, Arcendium ..... (ea). £13.00
Instigator System Toolkit (Dabs) £43.43
All other Arc software at 5% disc.on RRP, eg,
Acorn Assembler, Lisp, Prolog X £189.05
Acorn Desktop Publisher £141.55
ArcComm (BBC Soft) £24.74
Artisan £33.00
Artisan Support Disc £16.48
Autosketch £75.05
Corruption (Magnetic Scrolls) £20.61
Deltabase (Minerva) £24.74
Disc Tree (Mitre) £41.26
Euclid (Ace) £37.17
First Word Plus (Acorn) £75.95
Fish (Magnetic Scrolls) £20.61
GammaPlot (Minerva) £57.79
Graphic Writer (Clares) £24.78
Hearsay (Beebug) £57.00
Logistix (Acorn) £94.05
Orion, Hoverbod etc. ..... (ea.) £12.35
PipeDream £94.05
PipeDream Spellchecker £40.85
Presenter (Lingenuity) £23.70
ProArtisan (Clares) £140.39
Quazer (Impact) £10.69
Render Bender (Clares) £66.05
RISC OS Companion Vol.1 ..... £47.45
System Delta Business A/cs £231.30
(Modules for above) £53.66
System Delta Plus (Minerva) £57.79
Toolkit Plus (Clares) £41.26
Twin £27.55
Additional Arc Software Manuals (Acornsoft)
First Word Plus, Assembler ..... (ea.) £10.00
C, Pascal, Fortran, SymDebug ..... (ea.) £8

Golden Visions Software
Aristo - The Art Package £83.30
Discmaster - Disc Copier £13.10
Doc - The Database £31.80
Fidelio - The Sound System £50.00
Penetrator - Breakout Game £20.00

Save up to £11

New Educational Bundle

For a limited period we are offering ALL THREE Fun School 1 AND Nursery Rhymes in a special educational bundle.

FUN SCHOOL!

Ages 2-5

Alphabet
Colours
Counting
House
Magic Garden
Matchmaker
Numbers
Pelican
Seaside
Snap

PELICAN
Teach your children to cross the road safely at a Pelican crossing

Ages 5-8

Balance
Castle
Derrick
Fred's Words
Hilo
Maths Test
Mouser
Number Signs
Seawall
Super Spell

NUMBER SIGNS
Provide the correct arithmetic sign and aim to score ten out of ten

- Use your BBC Micro to teach and amuse your children at the same time.
- Three packages crammed full of educational programs – and so easy to use!
- Each program has been educationally approved after extensive testing in the classroom.

TAPE £9.95
5¼" DISC £12.95

Ages 8-12

Anagram
Codebreaker
Dog Duck Corn
Guessing
Hangman
Maths Hike
Nim
Odd Man Out
Pelmanism
Towers of Hanoi

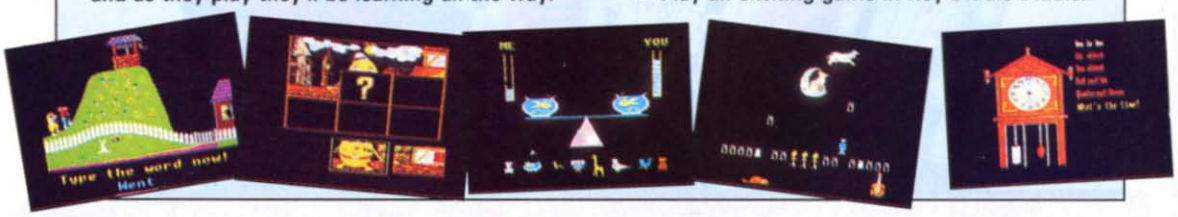
HANGMAN
Improve your child's spelling with this fun version of the popular game

NURSERY RHYMES

5 fun-packed educational programs . . . for young children everywhere

This delightful collection of programs is based around children's favourite Nursery Rhymes. There's plenty of sparkling colour, sound and captivating animation to keep them riveted – and as they play they'll be learning all the way.

- ★ Tell the time with Hickory Dickory Dock.
- ★ Assemble the jigsaw in Humpty Dumpty.
- ★ Learn to spell with Jack and Jill.
- ★ Match the animals in See Saw Marjory Daw.
- ★ Play an exciting game in Hey Diddle Diddle.



Send for your collection today using the form on Page 119

THE MICRO USER SUMMER COLLECTION

62 programs in all

RRP £38.65

OFFER PRICE £19.95

We've brought together some of the most popular compilations ever to have appeared in *The Micro User* for this summer special offer. For a limited period, we are offering them on seven 5.25" discs for the give-away price of just £19.95.

WHAT YOU GET

- ★ 9 Classic Card and Board Games Volume 1
- ★ 9 Classic Card and Board Games volume 2
- ★ Ten of the Best Ram and Disc Utilities
- ★ Ten of the Best Graphics Utilities
- ★ Ten of the Best Games
- ★ Ten of the Best Utilities
- ★ Classic Arcade Games

To order please use the form on Page 119

SUPERIOR SELECTION

Here's a special reader offer of the best games released by Superior Software – at savings of up to £5!

A Question of Sport

The home computer version of the most popular TV Sports quiz.

With David Coleman asking the questions and Ian Botham and Bill Beaumont heading the teams, you can pit your wits against your family, your friends or your computer.

There are six exciting rounds, including Pictureboard, Mystery Personality and a Quickfire Round.

Can you beat the experts?

	Tape	5.25" disc	3.5" disc
RRP	£12.95	£14.95	£19.95
Our Price	£9.95	£10.95	£14.95
SAVE	**£3**	**£4**	**£5**

Pipeline

In the 25th century the Earth's supplies of sulphur had become so badly depleted that mining operations were established on Io, one of the moons of Jupiter. Following a volcanic eruption on Io, the robot-controlled extraction platforms have been engulfed in a burning sea of sulphur and are now malfunctioning.

Can you save the day?

	Tape	5.25" disc	3.5" disc
RRP	£9.95	£11.95	£14.95
Our Price	£7.95	£8.95	£10.95
SAVE	**£2**	**£3**	**£4**

By Fair Means Or Foul

A realistic boxing simulation in which you can cheat... if the ref's not looking!

You're behind on points and time is running out. The ref looks half asleep. A quick head-butt and a sly punch below the belt and your opponent is toppling over. But as he falls his knee strikes you a paralysing blow.

Have you got what it takes?

	Tape	5.25" disc	3.5" disc
RRP	£9.95	£11.95	£14.95
Our Price	£7.95	£8.95	£10.95
SAVE	**£2**	**£3**	**£4**

The Last Ninja

The secrets of the Ninjitsu way had been jealously guarded for centuries, only once every decade were the scrolls seen at the ritual of the White Ninja. None coveted these secrets more than the evil Shogun. Seizing the opportunity of the ritual he sprang a fiendish trap that destroyed the brotherhood, except for one... You. The Last Ninja.

Your sworn oath is to recover the scrolls, you travel to the mystical lands of the Shogun. Already his guards are mastering the ways of the Ninjitsu. To reach the Shogun's Palace you must use all your weapon craft and fighting skills as you travel through dangerous wastelands and magnificent gardens, then descend into the direst dungeons before the final confrontation.

You cannot fail. You are the last Ninja...

	Tape	5.25" disc	3.5" disc
RRP	£9.95	£11.95	£14.95
Our Price	£7.95	£8.95	£10.95
SAVE	**£2**	**£3**	**£4**

To order please use the form on Page 119

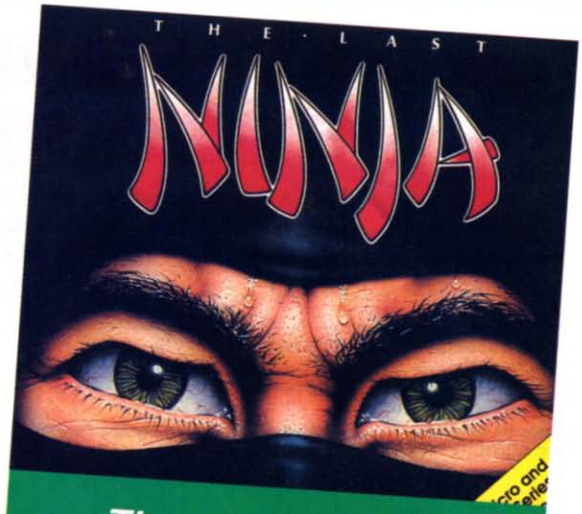
Get THE·LAST NINJA FREE!

A subscription to *Micro User* is excellent value for money. With it you get the latest issue delivered to your door before it's in the shops PLUS a program packed cassette or disc with each magazine.

And now you get even more for your money because with your first issue we'll send you a copy of the latest hit from Superior Software, The last Ninja – absolutely FREE!

That's a gift worth £9.95 with the tape version, £11.95 for the 5.25" disc and £14.95 for the 3.5" disc version!

Place your order today. We'll send you The Last Ninja. And you'll receive* The Micro User *each month, plus the free tape or disc that will save the wear and tear on your fingers.



The story so far...

"The secrets of the Ninjitsu way had been jealously guarded for centuries, only once every decade were the scrolls seen at the ritual of the White Ninja.

"None coveted these secrets more than the evil Shogun. Seizing the opportunity of the ritual he sprang a fiendish trap that destroyed the brotherhood, except for one... You. The Last Ninja.

"Your sworn oath is to recover the scrolls, you travel to the mystical lands of the Shogun. Already his guards are mastering the ways of the Ninjitsu.

"To reach the Shogun's Palace you must use all your weapon craft and fighting skills as you travel through dangerous wastelands and magnificent gardens, then descend into the direst dungeons befor the final confrontation.

"You cannot fail. You are the last Ninja..."

Save up to £14.95

To order please use the form on Page 119

THE MICRO USER ORDER FORM

Please allow up to 28 days for delivery

Valid until September 30, 1989

Annual subscription

NEW

(with monthly tape or disc and The Last Ninja – UK only)

(See opposite)

£ p

		New *		Renewal	
Magazine + monthly tape	£23	*2371*		*2372*	
Magazine + monthly (40 track) 5.25"disc	£23	*2373*		*2374*	
Magazine + monthly (80 track) 5.25" disc	£23	*2375*		*2376*	
Magazine + monthly 3.5" disc	£27	*2377*		*2378*	
Europe & Eire: Surface	£28	*2365*		*2114*	
Overseas: Surface	£34	*2366*		*2367*	
Overseas: Air	£45	*2004*		*2113*	

** Orders received by August 18 will commence with October issue*

Back issues

Mar 1989	£1.75	*2524*			
Apr 1989	£1.75	*2525*			
May 1989	£1.75	*2526*			
Jun 1989	£1.75	*2527*			
Jul 1989	£1.75	*2528*			
Aug 1989	£1.75	*2529*			

Add 50p per issue for Europe & Eire/£2 Overseas

March-August 1989 bundle £8.95 *2237*

Add £3 for Europe & Eire/£12 Overseas

Fontstyle *(see page 48)*

NEW

Fontstyle	5.25" (40/80T)	£9.95	*2108*
Fontstyle	3.5" (BBC ADFS)	£10.95	*2109*
Fontstyle	(Archimedes)	£11.95	*2110*
64 Fonts	5.25" (40T)	£14.95	*2115*
64 Fonts	5.25" (80T)	£14.95	*2116*
64 Fonts	3.5" (BBC/Archimedes)	£19.95	*2117*

Add £2 for Europe & Eire /£5 Overseas

Arcade Game Creator (DFS only) *(see page 82)*

Cassette & Manual	£9.95	*2268*
5.25" disc (40T) & Manual	£11.95	*2269*
5.25" (80T) & Manual	£11.95	*2270*

Add £2 for Europe & Eire /£5 Overseas

DTP Yearbook *(see page 126)*

£9.95 *0505*

Add £2 for Europe & Eire/£5 Overseas

Summer Collection *(See page 116)*

NEW

5.25" disc (40T)	£19.95	*2120*
5.25" disc (80T)	£19.95	*2121*

Add £3 for Europe & Eire/£6 Overseas

Superior Selection *(See page 117)*

NEW

	Tape		5.25"		3.5"	
A Question of Sport	£9.95	*2200*	£10.95	*2201*	£14.95	*2202*
Pipeline	£7.95	*2203*	£8.95	*2204*	£10.95	*2205*
By Fair Means or Foul	£7.95	*2206*	£8.95	*2207*	£10.95	*2208*
The Last Ninja	£7.95	*2209*	£8.95	*2210*	£10.95	*2211*

Add £2 per program Europe & Eire / £5 Overseas

Ten of the Best Educational programs

(DFS only) *(see page 129)*

Cassette	£5.95	*2189*
5.25" Disc (40T)	£6.95	*2190*
5.25" Disc (80T)	£6.95	*2191*

Fun School and Nursery Rhymes

(see page 115)

Cassette	£9.95	*2090*
5.25" Disc BBC B, B+ (40T)	£12.95	*2091*
5.25" Disc BBC B, B+ (80T)	£12.95	*2092*

Add £3 Europe & Eire / £6 Overseas

Mini Office II

(See page 50)

£ p

Available For:	MO2	Book	Example Disc	Price	Code	Please Tick
Tape users	●	–	–	£14.95	*2368*	
Model B, B+ (40T disc)	●	–	–	£16.95	*2369*	
Model B, B+ (80T disc)	●	–	–	£16.95	*2370*	
Master (5.25" 40T disc)	●	–	–	£19.95	*2283*	
Master (5.25" 80T disc)	●	–	–	£19.95	*2028*	
Tape users	●	●	–	£19.95	*2271*	
Model B, B+ (40T disc)	●	●	–	£21.95	*2272*	
Model B, B+ (80T disc)	●	●	–	£21.95	*2273*	
Master (5.25" 40T disc)	●	●	–	£24.95	*2281*	
Master (5.25" 80T disc)	●	●	–	£24.95	*2276*	
Model B, B+ (40T disc)	●	●	●	£29.95	*2274*	
Model B, B+ (80T disc)	●	●	●	£29.95	*2275*	
Master (5.25" 40T disc)	●	●	●	£32.95	*2282*	
Master (5.25" 80T disc)	●	●	●	£32.95	*2277*	

Binder

£4.95 *2221*

Add £4 for Europe & Eire/£6 Overseas

Dust Covers

BBC B & B+	£3.95	*2220*
BBC Master	£3.95	*2222*
BBC Master Compact	£3.95	*2224*

Add £1 for Europe & Eire/£2 Overseas

Books

The Complete BBC Computer User Handbook	£14.95	*2163*
The Advanced Reference Manual for the BBC Master	£16.95	*2164*

Add £2 per book for Europe and Eire, £5 for Overseas

Forth Rom

£19.95 *2046*

Add £4 per Rom for Europe & Eire £15 Overseas

Fun School 2 (DFS only)

(See page 22)

	Tape		5.25" disc (40/80T)	
	£9.95		£12.95	
Under 6s	*2239*		*2240*	
6-8 year olds	*2242*		*2243*	
Over 8s	*2245*		*2249*	

Add £2 for Europe & Eire/£4 Overseas

Morley Teletext Adapter *(see page 74)*

Teletext Adapter (40T utilities disc) + Design 7 Plus	£99.95	*2157*
Teletext Adapter (80T utilities disc) + Design 7 Plus	£99.95	*2158*
Power Supply	£9.95	*2054*

Add £4 for Europe and Eire, £7 for Overseas

Transparent calculator

(see page 30)

Tick here if you are ordering the calculator £7.95 *2118*

Tick here if you are spending £25 or more on reader offers (excluding subscriptions) and wish to claim your FREE calculator *2119*

TOTAL

Payment: please indicate method (✓)

☐ Cheque/Eurocheque made payable to Database Publications Ltd.

☐ Access/Mastercard/Eurocard/Barclaycard/Visa Expiry Date / /

No. | | | | | | | | | | | | | | | | |

Name _____ Signed _____

Address _____

_____ Postcode _____

Daytime telephone number in case of queries _____ MU9

Send to:
Database Direct
FREEPOST, Ellesmere Port,
South Wirral L65 3EB

(No stamp needed if posted in UK)

Please allow up to 28 days for delivery

Order at any time of the day or night

Tel: 051-357 2961

Orders by Fax:	Orders by Prestel:	Orders by MicroLink:
051-357 2813	Key *89, then 614568383	MAG001

Don't forget to give your name, address and credit card number

INTEGRA-β

THE Expansion for the BBC Model 'B'

- 64K Sideways Ram + 8 sockets
- Can accept another 128K Ram
- Private & Shadow Ram
- Ram is all Battery-backed
- Real-time Clock
- Basic Window Manager

With the INTEGRA-β you have the choice of operating environment to suit the particular application, whether wordprocessing or other business activities, programming, data collection and manipulation, composition of music or simply games.

The options available include not only the standard BEEB but also emulations of the more desirable features of the 'B+' series and 'Master'.

Particularly useful is the extensive control facilities for Sideways Ram, using both absolute and 'psuedo' addressing, both in the 'B+' and 'Master' modes of bank identification. Handling Rom images is much simpler than changing Roms.

The INTEGRA-β is compatible with DFS, ADFS and Second Processors conforming to Acorn® protocols and software such as Acornsoft View & Viewsheet, Advanced Memory Systems AMX Super-Art and Stop Press!, Computer Concepts Inter- series and Wordwise Plus, Music 5000 and Ample from Hybrid Technology, The Publisher and Genie from Permanent Memory Systems, plus other legally written packages.

Comprehensive Technical Reference due for issue in late August at £5.00 plus P&P.

Offer Prices	UK (Incl. P&P, ins.)	Qnty	Europe (Plus P&P, ins.)	Qnty	Others (Plus P&P, ins)
INTEGRA-β	£135.00		£124.00		£120.00
32K Ram Chip	£16.00	£1.00	£14.00	£2.00	£14.00
W.P. Switch Box (2 fitted of 6)	£7.00	£1.50	£8.00	£3.00	£7.00
Extra Switch Unit	£1.50	£1.00	£1.50	£2.00	£1.50
Rockwell 65C02 CPU	£8.75	£1.00	£8.75	£2.00	£8.75

COMPUTECH
2, Belle Isle Terrace, Main Street, Grange over Sands, Cumbria. LA11 6AE
Telephone: 05395 34604

POOLSWINNER II

THE ULTIMATE POOLS PREDICTION PROGRAM

- **MASSIVE DATABASE** Poolswinner is a sophisticated Pools prediction aid. It comes complete with the largest database available – 22000 matches over 10 years.
- **PREDICTS** Not just SCOREDRAWS, but AWAYS, HOMES and NO SCORES.
- **SUCCESSFUL** SELEC guarantee that Poolswinner performs significantly better than chance.
- **ADAPTABLE** Probabilities are given on every fixture – choose as many selections as you need for your bet. The precise prediction formula can be set by the user – you can develop and test your own unique method.
- **SIMPLE DATA ENTRY** All team names are in the program. Simply type in the reference numbers from the screen. Or use FIXGEN to produce fixture list automatically (see below).
- **LEAGUE AND NON-LEAGUE** All English and Scottish League teams are supported, and also the non-league sides often used on pools coupons.
- **PRINTER SUPPORT** Full hard copy printout of data if you have a printer.

PRICE £24.00 (all inclusive)

NOW AVAILABLE

FIXGEN 89/90

AT LAST: No more struggling for hours to get the fixture list into the computer. FIXGEN has been programmed with all English and Scottish League fixtures for 1989/90. Simply type in the date, and the full fixture list is generated in seconds. Fully compatible with Poolswinner. Yearly updates available.

POOLSWINNER with FIXGEN £26.50 (for both)

COURSEWINNER V3

THE PUNTERS COMPUTER PROGRAM

NOT JUST A TIPSTER PROGRAM, Coursewinner V3 can be used by experts and occasional punters alike. You can develop and test your own unique winning system by adjusting the analysis formula, or use the program in simple mode. Coursewinner V3 uses statistical analysis of major factors including past form, speed ratings, course statistics, prize money, weight, going, trainer and jockey form etc, etc. It outputs most likely winners, good long odds bets, forecasts, tricasts etc. The database includes vital course statistics for all British courses. You can update the database – never goes out of date. *FULL PRINTER SUPPORT.*

PRICE £24.00 (all inclusive) includes Flat AND National Hunt versions.

AVAILABLE FOR AMSTRAD CPCs, BBCs, COMMODORE 64/128, SPECTRUM, AMSTRAD PCW, IBM Format, COMMODORE AMIGA, ATARI ST

Please state tape or disc (add £2.00 for disc).

Send Cheques/POs for return of post service to . . .

selec SOFTWARE

VISA Access

phone 24 hrs

62 ALTRINCHAM RD, GATLEY, CHEADLE, CHESHIRE SK8 4DP. ☎ 061-428 7425

(Send for full list of our software)

PANASONIC DISKS PRINTERS KXP1081 ORGANISERS

PC1640 PC1512 PCW

DENHAM COMPUTER PRODUCTS

31 Brahms Rd, Basingstoke, Hants RG22 4JH
Tel. (0256) 64752
(24hr Answer-phone)

ARCHIMEDES

305 Base	£797.40
305 Mono	£865.30
305 Colour	£1048.25
310 Base	£1033.50
310 Mono	£1099.80
310 Colour	£1280.00
310M Base	£1098.60
310M Mono	£1160.45
310M Colour	£1345.50
410 Base	£1378.30
410 Mono	£1435.60
410 Colour	£1625.40
420 Base	£1946.30
420 Mono	£2000.30
420 Colour	£2195.60
440 Base	£2852.60
440 Mono	£2924.60
440 Colour	£3095.40
A3000	£740.30
Floppy Disk	£104.80
20Mb HD + Controller	£425.30
Econet Module	£42.30
Backplane	£36.87
Rom Expansion Card	£58.30
I/O Expansion Card	£79.40
Midi Expansion Card	£66.22
Midi Add-on to I/O	£37.40

BBC MASTER

Master 128	£395.60
Turbo Module	£111.85
Eprom Cartridge	£12.80
IEEE Interface	£265.40
2nd Processor	£49.80
Econet Module	£47.40

BBC COMPACT

Entry System	£304.02
TV System	£316.07
Mono System	£346.75
Colour System	£474.94

CAMBRIDGE Z88

Z88 Computer	£231.70
Mains Adaptor	£8.67
128K Ram Pack	£42.35
128K Eprom Pack	£42.35
32K Ram Pack	£17.34
32K Eprom Pack	£17.34
Eprom Eraser	£33.68
PC Link II	£30.39
Parallel Cable	£22.82
Serial Cable	£8.67
BBC Link	£20.63
512K Ram Pack	£162.68
Carrying Case	£8.67

OTHER HARDWARE, SOFTWARE, DISKS, STATIONERY ETC. AVAILABLE. PLEASE RING FOR PRICES
WE CAN SUPPLY ANY COMPUTER PRODUCT YOU REQUIRE. ALL PRICES EXCLUDE VAT. DELIVERY FREE (UK MAINLAND ONLY). PLEASE ADD 15% VAT TO ALL ORDERS. ON-SITE MAINTENANCE CONTRACTS AVAILABLE PLEASE RING FOR PRICES

CO-PROCESSORS PAPER

PARROT PSION NEC PPC512 PORTABLES PPC640 LABELS

Mijas Software

Bringing the new software world to YOUR BBC Micro

New Issue of 'A Book on C' by Berry and Meekings £11 inclusive

All software available for Archimedes as well as BBC B and Master series

Assembler, Linker, Debug, Shell and Small 'C'
New Optimiser also available (see below) £50 +VAT

Professional-style assembler, modular, relocatable, disk to disk.
Full Specification Linker giving compact run-files anywhere in memory.
Source-Level Debug for rapid and effective testing of 'C' or assembler.
Full Library facilities, 'C' and assembler Libraries provided (with sources).
★Extended implementation of the original Small C including BBC graphics.
Full Source Code provided for the 'C' compiler, add your own features!
Many times faster than BASIC, 40K+ Program space in stand-alone mode.
Post-sales support, low cost updates.
★ Original Small 'C' code supplied with the development system at the cost of distribution

New Code Optimiser

Revolutionary new Code Optimiser for Small C. Your programs use LESS memory and run up to THREE TIMES faster than before. Forget about assembler code and use Mijas Small C for high-speed graphics, text and word processors and many other programs. This new optimiser does not change your programs, has no restrictions, and makes them run up to 24 times faster than BBC BASIC. Upgrade from Small C (any issue) £25+vat. Complete system with Small C and optimiser £70+vat.

Other Microprocessors

Development system for the Mitubishi 740 series as well as for the 6502 and 65C12. Supports all the new addressing modes. Mix C and Assembler. Write software for single board computers and other industrial applications using your BBC computer. Price including optimiser £150+VAT.

All software available in DFS or ADFS format on 5.25 or 3.5in. Discs.

Laser Typesetting Program

Professional printing you can afford today. Our new LASER TYPESETTING PROGRAM prints multi-window multi-column, multi-page Text & Graphics. Software £25+VAT.Requires one of the new low-cost Laser or desk-jet printers with proportional fonts. Written in Small C. Will run on Archimedes or BBC B or Master series computer. Full C Source provided.

Now at last you can achieve the speed of a true compiler without loosing the program size advantages of BASIC.

Use it for games business or industrial software. Ideal for learning structured programming and compiler techniques.

Educational and departmental orders welcome. Please write for quantity and networking discounts. Full support on all software.

VISA Access

Mijas Software, Winchester Rd. Micheldever Winchester Hants SO21 3DG
Telephone 0962-89-352 (24 Hr. Answering service)

◀ *From Page 81*

```
  230 :
  240 DEF FNinput:LOCAL A%,X%,Y%:*FX15
  250 VDU31,10,4:PROCcursor(1)
  260 !&70=&700:?&72=29:?&73=0:?&74=255
  270 X%=&70:Y%=0:A%=0:CALL&FFF1
  280 PROCcursor(0):=$&700
  290 :
  300 DEFPROCdetails:PROCcursor(0)
  310 FOR Y%=1 TO 2:VDU31,12,Y%,131,141
  320 PRINT"QUICK  MENUS":NEXT
  330 PRINTTAB(8,4)CHR$130"Written by Al
i Harwood"TAB(10,6)CHR$134"(c) The Micro
 User"
  340 PRINTTAB(0,10)CHR$129"Menu items (
15 max)"CHR$133"<00>"
  350 PROCcursor(1):*FX15
  360 REPEATI$="0":REPEATVDU31,23,10:REP
EATREPEATA=GET-48:UNTILA=79OR(A>-1ANDA<1
0):IFA=79I$="0"ELSEI$=STR$A
  370 PRINTI$:UNTILA<79
  380 VDU31,23,10:REPEATA=GET-48:UNTILA=
79ORA=-35OR(A>-1ANDA<10):IFA=79I$="00"EL
SEIFA>-35I$=I$+STR$A
  390 IFA=-35I$="0"+I$
  400 IFVALI$>15ORVALI$<1VDU7:I$="00":A=
79
  410 PRINTCHR$8I$:UNTILA<79:items%=VALI
$
  420 PROCcursor(0):VDU28,0,21,39,16
  430 PRINTTAB(0,4)CHR$131"Heading"CHR$1
30"<"SPC29">";:h$=FNinput
  440 PRINT:FORI=1TOitems%
  450 PRINTCHR$129"Item "STRING$(2-LENST
R$I," ");I;CHR$134"<"SPC29">";:item$(I)=
FNinput
  460 NEXT:start%=1+(15-items%)/2
  470 ENDPROC
  480 :
  490 DEFPROCshow:VDU26,12
  500 PRINTTAB(0,start%)CHR$146STRING$(3
8,CHR$175)'CHR$130CHR$141SPC(19-LENh$/2)
h$'CHR$130CHR$141SPC(19-LENh$/2)h$'CHR$1
46STRING$(38,CHR$163)
  510 Q=0:FORA=1TOitems%:IFLENitem$(A)>Q
 Q=LENitem$(A)
  520 NEXT:Q=Q+4:startx%=20-Q/2
  530 FORA=1TOitems%:IFA=1PRINTTAB(start
x%-2)CHR$129CHR$157CHR$130item$(A)SPC(Q-
2-LENitem$(A))CHR$156:NEXTELSEPRINTTAB(s
tartx%)CHR$130item$(A):NEXT
  540 PRINTCHR$146STRING$(38,CHR$240)'CH
R$130SPC2"Use ^ and"CHR$141"v"CHR$140"th
en Return to select"'CHR$146STRING$(38,
CHR$175)
  550 ENDPROC
  560 :
  570 DEFPROCdisplay
  580 PRINTTAB(0,start%)CHR$(144+c%(0))'
CHR$(128+c%(1))'CHR$(128+c%(1))'CHR$(144
+c%(0))
  590 FORA=1TOitems%:IFA=1PRINTTAB(start
x%-2)CHR$(128+c%(3))CHR$157CHR$(128+c%(2
)):NEXTELSEPRINTTAB(startx%)CHR$(128+c%(
2)):NEXT
  600 PRINTCHR$(144+c%(0))'CHR$(128+c%(0
))"CHR$(144+c%(0))
  610 PRINTTAB(1,24)CHR$(c%(0)+128)"BORD
ER"SPC5CHR$(c%(1)+128)"HEADING"SPC4CHR$(
c%(2)+128)"TEXT"SPC4CHR$(c%(3)+128)"BAR"
;
  620 ENDPROC
  630 :
  640 DEFPROCcolours
  650 X=0:REPEAT
  660 PROCcursor(0)
  670 PROCdisplay
  680 PROCcursor(1)
  690 VDU31,x%(X),24:A=GET
  700 IFA=136X=X-1:IFX<0X=3
  710 IFA=137X=X+1:IFX>3X=0
  720 IFA=139c%(X)=c%(X)+1:IFc%(X)>7c%(X
)=1
  730 IFA=138c%(X)=c%(X)-1:IFc%(X)<1c%(X
)=7
  740 UNTILA=27:CLS
  750 PROCcursor(0)
  760 ENDPROC
  770 :
  780 DEFPROCsave
  790 PROCcursor(1):INPUTTAB(0,3)"Enter
line number: "line
  800 VDU31,0,6,131:INPUT"Enter filename
: "fn$:PROCcursor(0)
  810 ON ERROR GOTO 100
  820 PROCoscli("SPOOL "+fn$)
  830 @%=0:PRINTLine"DATA "h$;
  840 FOR c%=0TO3:PRINT","c%(c%);:NEXT
  850 PRINT","start%","startx%","items%;
  860 FOR A%=0 TO items%-1
  870 IF A%MOD4=0 line=line+1:PRINT"line
"DATA "; ELSE PRINT",";
  880 PRINT item$(A%+1);:NEXT
  890 PRINT:PROCoscli("SPOOL")
  900 ENDPROC
  910 :
  920 DEFPROCoscli(S&700):LOCAL X%,Y%
  930 X%=0:Y%=&7:CALL&FFF7:ENDPROC
```

```
 10 =    0 0 | 320 = C9B0 B | 630 = 9719 B
 20 =    0 0 | 330 = 5398 6 | 640 = D2F2 A
 30 =    0 0 | 340 = 5050 3 | 650 = 9231 F
 40 = 9719 9 | 350 = CEBD 6 | 660 = EB93 F
 50 = 8AFC 8 | 360 = ED51 D | 670 = 2F83 B
 60 = DEBB A | 370 = DB95 A | 680 = D8A2 3
 70 = 1241 D | 380 = 5A7E 6 | 690 = A559 0
 80 = 85D2 9 | 390 = BF73 6 | 700 = CDCC 2
 90 = 3F54 C | 400 = A004 3 | 710 = 2A2E 3
100 = 90DB 0 | 410 = E228 D | 720 = 57DA 4
110 = FD2E B | 420 = 55EB C | 730 = 784B D
120 = 9719 C | 430 = A31E 4 | 740 = D64A 2
130 = B0F8 5 | 440 = C16B 0 | 750 = EB93 C
140 = F8EA 8 | 450 = C3D9 C | 760 = ED0F 6
150 = CD97 5 | 460 = 66D9 9 | 770 = 9719 0
160 = ED0F F | 470 = ED0F D | 780 = 7A2C 5
170 = 9719 A | 480 = 9719 C | 790 = 961F 8
180 = C718 5 | 490 = 3B0D 1 | 800 = B9DD 5
190 = 9719 D | 500 = E025 3 | 810 = 8096 2
200 =  3BD 3 | 510 = A067 6 | 820 = 7859 A
210 = 65E3 B | 520 = 7147 B | 830 = C97F E
220 = ED0F 5 | 530 = 3792 8 | 840 = 72F9 B
230 = 9719 8 | 540 = EADA 2 | 850 = 977A 5
240 = 8876 0 | 550 = ED0F 9 | 860 = 2CE6 C
250 =  FEF D | 560 = 9719 D | 870 = 82C5 7
260 = F494 1 | 570 = C225 8 | 880 = 350E E
270 = 6874 B | 580 = C4A6 6 | 890 = 635B E
280 = 7A12 C | 590 = 5D72 E | 900 = ED0F 8
290 = 9719 6 | 600 = BA50 C | 910 = 9719 A
300 = 1C3B C | 610 = 8CF1 D | 920 = AB72 5
310 = 8C3D 2 | 620 = ED0F 0 | 930 = 5FD3 E
```

Program II

```
  10 REM Quick Menus demo
  20 REM by Ali Harwood
  30 REM (c) The Micro User
  40 :
  50 DIM it$(15)
  60 MODE7:VDU23;8202;0;0;0;
  70 RESTORE430:o$=FNmenu
  80 PRINTTAB(0,23)"You chose: "o$
  90 END
 100 :
 110 DEFFNmenu:*FX4,1
 120 LOCAL h$,c0%,c1%,c2%,c3%
 130 LOCAL sx%,its%,Ymx%,Ymn%
 140 LOCAL S%,Y%,Q%,Z%,A%,L$
 150 READ h$,c0%,c1%,c2%,c3%
 160 c0%=c0%+144:c1%=c1%+128
 170 c2%=c2%+128:c3%=c3%+128
 180 READ S%,sx%,its%
 190 L$=CHR$c0%+STRING$(38,CHR$44)
 200 FORA%=1TOits%:READit$(A%):NEXT
 210 Ymn%=S%+4:Ymx%=S%+its%+3:Y%=Ymn%
 220 FOR A%=1 TO its%
 230 L%=LENit$(A%):IF L%>Q% Q%=L%
 240 NEXT:Q%=Q%+4:CLS
 250 PRINTTAB(0,S%)L$
 260 L%=19-LENh$/2:FORA%=0TO1
 270 PRINTCHR$c1%CHR$141SPCL%h$
 280 NEXT:PRINTL$
 290 FORA%=1TOits%:L%=Q%-2-LENit$(A%)
 300 PRINTTAB(sx%-2)CHR$c3%" "CHR$c2%it
$(A%)SPCL%CHR$156
 310 NEXT:PRINTL$
 320 PRINTCHR$c1%SPC2"Use ^ and v then
Return to select"
 330 PRINTL$:Y%=Ymn%
 340 REPEAT VDU31,sx%-1,Y%,157
 350 A%=GET:VDU31,sx%-1,Y%,32
 360 IFA%=139Y%=Y%-1:IFY%<Ymn%Y%=Ymx%
 370 IFA%=138Y%=Y%+1:IFY%>Ymx%Y%=Ymn%
 380 FOR Q%=1 TO its%
 390 IF A%=ASCit$(Q%) Y%=Q%+S%+3:A%=13:
Q%=its%
 400 NEXT:UNTIL A%=13
 410 =LEFT$(it$(Y%-S%-3),1)
 420 :
 430 DATA"HELLO THERE",3,6,4,7,6,12,5
 440 DATA"Here is","One super","Quick m
enu","Inc. colour"
 450 DATA"Too !!!..."
```

```
 10 =    0 0 | 160 = 915D 9 | 310 = A611 3
 20 =    0 0 | 170 = EAF4 C | 320 = D65E 8
 30 =    0 0 | 180 = E8A9 1 | 330 =  AF4 7
 40 = 9719 9 | 190 = 70EE 2 | 340 = 2DA5 E
 50 = EEE0 A | 200 = 7ED8 0 | 350 = B8A6 D
 60 = 8B0B E | 210 = E492 3 | 360 = FB12 C
 70 = B480 2 | 220 = B8CE C | 370 = 6ABC 8
 80 = 67E0 E | 230 = 6BCA 6 | 380 = EDF3 B
 90 = FD2E 9 | 240 = AC21 9 | 390 = 7A44 9
100 = 9719 A | 250 = B02A C | 400 = B9CC D
110 =  D6D 8 | 260 = D7CB A | 410 = CCB0 9
120 = 6E5C 4 | 270 = 35C6 E | 420 = 9719 C
130 = 1394 A | 280 = A611 5 | 430 = 5DB7 C
140 = 36A3 9 | 290 = 8058 0 | 440 = 9609 5
150 = 8D05 F | 300 = 1F34 B | 450 = F4A9 1
```

Listing I: Screen dump

```
  10 REM MODE 4 FLICK BOOK SCREEN DUMP
  20 REM By Mike Cook
  30 MODE 4
  40 FOR A=0 TO 3 STEP 3
  50 P%=&A00
  60 [
  70 OPT A
  80 .DUMP
  90 LDA =&3
 100 STA &78 \ MSB OF Y VALUE
 110 LDA =&FF : STA &77
 120 LDA =0 \ X VALUE
 130 STA &70 : STA &71
 140 JSR ALF
 150 .PLINE JSR PPREP
 160 LDA &77 : STA &72
 170 LDA &78 : STA &73
 180 .SMORE \ SEND A BYTE
 190 LDA =8 : STA &79 \ BIT COUNT
 200 .NPIXL
 210 LDX =&70 : LDY =&0
 220 LDA =9 : JSR &FFF1
 230 ROR &74 : ROL &76
 240 \MOVE Y POINTER ON
 250 LDA &72 : SEC
 260 SBC =4 : STA &72
 270 DEC &79 : BNE NPIXL
 280 \ GRAPHICS VALUE TO SEND NOW IN &7
6
 290 LDA &76: JSR PPAIR
 300 \RESTOR Y VALUE
 310 LDA &77 : STA &72
 320 \ MOVE X POINTER ON
 330 LDA &70 : CLC
 340 ADC =4 : STA &70
 350 BCC NXWR
 360 INC &71
 370 .NXWR
 380 LDA &71 : CMP =5
 390 BNE SMORE
 400 LDA =0 \ RESTORE X VALUE
 410 STA &70 : STA &71
 420 \RESTOR Y VALUE
 430 LDA &77 : STA &72
 440 LDA &73
 450 AND =2 \ TEST TO SEE IF WAS LOWER
HALF
 460 BEQ NLINE
 470 LDA &78 : AND =1
 480 STA &73 : JMP SMORE
 490 .NLINE
 500 \ END OF GRAPHICS LINE SEND A CR
 510 LDA =13 : JSR PPAIR
 520 \ DECREMENT THE Y VALUE
 530 LDA &77 : SEC
 540 SBC =32 : STA &77
 550 BCS NWR
 560 DEC &78
 570 .NWR LDA &78
 580 AND =2 : BNE LOOP
 590 LDA =3 : JSR &FFEE \ TURN OFF PRIN
TER
 600 RTS
 610 .LOOP JMP PLINE
 620 .PPREP \ PREPAR PRINTER FOR GRAPHI
CS
 630 LDA =27: JSR PPAIR
 640 LDA =42: JSR PPAIR
 650 LDA =4 : JSR PPAIR
 660 LDA =128: JSR PPAIR
 670 LDA =2 : JSR PPAIR
 680 RTS
 690 .ALF \ ADJUST LINE FEED SPACING
 700 LDA =2 : JSR &FFEE
 710 LDA =27: JSR PPAIR
 720 LDA =51: JSR PPAIR
 730 LDA =24: JSR PPAIR
 740 RTS
 750 .PPAIR \ SEND JUST TO PRINTER
 760 PHA : LDA =1
 770 JSR &FFEE : PLA
 780 JSR &FFEE
 790 RTS
 800 .SLINE \ SOLID LINE
 810 LDA =1 : BNE DLINE
 820 .MLINE \ MARKED LINE
 830 LDA =0
 840 .DLINE \ DRAW BLANK LINE
 850 STA &74 \ STORE LINE PATTERN
 860 JSR ALF : JSR PPREP
 870 LDA =&AA : JSR PPAIR
 880 LDX =4
 890 .SLOOP LDY =159
 900 TXA : CMP =1
 910 BNE NLAST
 920 DEY
 930 .NLAST
 940 LDA &74: JSR PPAIR
 950 DEY : BNE NLAST
 960 LDA =&AA: JSR PPAIR
 970 DEX : BNE SLOOP
 980 LDA =13 : JSR PPAIR
 990 RTS
1000 ]
1010 NEXT
1020 PRINT"Printer dump now loaded"
1030 PRINT"Now run the flick book progr
am"
```

Get it right!

```
 10 =    0 0 |
 20 =    0 0 |
 30 = 20F1 1 |
 40 = 46C5 9 |
 50 = B886 D |
 60 = EB9E F |
 70 = DDA7 D |
 80 = F72A 8 |
 90 = 1AA7 9 |
100 = F7F8 2 |
110 = D68B 4 |
120 = 9120 B |
130 = 72A8 D |
140 = BC17 1 |
150 = 1776 D |
160 = A3C3 A |
170 = 38D1 2 |
180 = 8E9F 9 |
190 = F9DC B |
200 = 9332 C |
210 = 8BB7 D |
220 = 1990 9 |
230 = 74BA 5 |
240 =    0 5 |
250 = A1FA 7 |
260 = 4129 F |
270 = 8482 B |
280 =    0 B |
290 =  25D 9 |
300 =    0 9 |
310 = A3C3 4 |
320 =    0 4 |
330 = 38E2 E |
340 = D463 B |
350 =   66A 5 |
360 = 5A71 F |
370 = 112A 8 |
380 = EC3E E |
390 = 8DE6 4 |
400 = 9120 1 |
410 = 72A8 C |
420 =    0 C |
430 = A3C3 9 |
440 = C115 3 |
450 = 8D9D F |
460 =  ADE A |
470 = A0AB E |
480 = 4843 3 |
490 = FF5B 1 |
500 =    0 1 |
510 = B702 C |
520 =    0 C |
530 = D85D A |
540 = 51AF A |
550 = 3E62 3 |
560 = E2F0 2 |
570 = 52B9 A |
580 = A054 F |
590 = B71E 9 |
600 = 9843 5 |
610 = 62E7 C |
620 = 7D0B C |
630 = C722 A |
640 = 46E8 7 |
650 = 7752 1 |
660 = DE99 D |
670 = F839 B |
680 = 9843 4 |
690 = 34F0 A |
700 = B62F 3 |
710 = C722 6 |
720 =   614 6 |
730 = C2BD D |
740 = 9843 1 |
750 = EE73 0 |
760 = 1D0A 5 |
770 = CBAF 4 |
780 = C54D 2 |
790 = 9843 C |
800 = 3555 0 |
810 = D0A5 A |
820 = AF72 6 |
830 =  295 7 |
840 = E790 9 |
850 = B295 5 |
860 = C73D 3 |
870 = E318 3 |
880 = AAC1 C |
890 = D051 7 |
900 = 458F A |
910 = F452 7 |
920 = F888 3 |
930 = 21C5 3 |
940 =  4B7 6 |
950 = 4018 8 |
960 = 5AAC A |
970 = 3DC0 7 |
980 = B702 0 |
990 = 9843 E |
1000 = 8B58 3 |
1010 = 2C83 1 |
1020 = 1764 A |
1030 = 1E65 A |
```

Listing II: Flick book core

```
  10 REM FLICKBOOK
  20 MODE 4
  30 CLEAR
  40 PRINTTAB(11,4);"FLICK BOOK GENERAT
OR"
  50 PRINTTAB(14,6);"by Mike Cook"
  60 PRINTTAB(0,10);
  70 INPUT"How many frames do you want
to use ",FL%
  80 PRINTTAB(0,14);"Enter mode Test or
 Print (T/P)?";
  90 M$=GET$ : PRINT
 100 IF M$="P" THEN PRINT"Press RETURN
when printer is ready":PRINT"Or any othe
r key to cancle":R$=GET$:IF R$<>CHR$(13)
 110 IF (FL% AND 3)<>0 THEN FL%=(FL% AN
D &FFFC)+4
 120 FOR F%=1 TO FL%
 130 PROC_FRAME(F%)
 140 NEXT
 150 VDU26
 160 GOTO 20
 170 DEF PROC_GRID
 180 CLG
 190 MOVE 0,512 : PLOT 21,1280,512
 200 MOVE 640,0 : PLOT 21, 640,1023
 210 MOVE 0,0 : PLOT 21,1279,0
 220 MOVE 0,0 : PLOT 21,0,1023
 230 MOVE 1279,0 : PLOT 21,1279,512
 240 ENDPROC
 250 DEF PROC_FRAME(F%)
 260 LOCAL FT%
 270 FT%=F% AND 3
 280 IF FT%=1 THEN PROC_GRID:VDU 24,0;5
12;640;1023;:VDU29,0;512;
 290 IF FT%=2 THEN VDU 24,640;512;1279;
1023;:VDU29,640;512;
 300 IF FT%=3 THEN VDU 24,0;0;640;512;:
VDU29,0;0;
 310 IF FT%=0 THEN VDU 24,640;0;1279;51
2;:VDU29,640;0;
 320 PROC_DRAW(F%)
 330 VDU26
 340 IF FT%=0 THEN PROC_DUMP
 350 ENDPROC
 360 DEF PROC_DUMP
 370 IF M$<>"P" THEN R$=GET$:ENDPROC
 380 IF F%=4 THEN CALL &AA4
 390 FOR M%=1 TO 5
 400 CALL &ACA
 410 NEXT
 420 CALL &AC4
 430 CALL &A00
 440 IF (F% AND 15)=0 THEN VDU2,1,12,3
: IF F%<>FL% THEN CALL &AC4:VDU3
 450 ENDPROC
```

Get it right!

```
 10 =    0 0 | 160 = 2C82 2 | 310 = 6F10 D
 20 = 20F1 1 | 170 = D44B 5 | 320 =  E0B 3
 30 = 4A75 7 | 180 = 6A37 0 | 330 = B962 6
 40 = 2657 9 | 190 = FF64 B | 340 = 38B7 3
 50 = 8934 4 | 200 = 7CCF 5 | 350 = ED0F 9
 60 = 5A44 7 | 210 =  4A3 1 | 360 = 5476 7
 70 = 36DE 9 | 220 = 23E6 F | 370 = 52D1 7
 80 = 43A6 8 | 230 = 82CF 1 | 380 = 1139 2
 90 = 432F A | 240 = ED0F C | 390 = C985 D
100 = 5BDE 2 | 250 = 9DEC 1 | 400 = 1BD1 4
110 =  795 D | 260 = 535D 1 | 410 = 2C83 4
120 = 2B5B 4 | 270 = D1EC 5 | 420 = 35E3 C
130 = 411C 4 | 280 = D584 9 | 430 = 286D 6
140 = 2C83 1 | 290 = 92F7 C | 440 =  76B 3
150 = B962 F | 300 =   EC 7 | 450 = ED0F 5
```

Listing III: Diamonds

```
  10 DEF PROC_DRAW(F%)
  20 VDU5 : MOVE 4,32
  30 PRINT;F%;
  40 IF F%<FL%/2 THEN P=F%*8 ELSE P=(FL
%-F%)*8
  50 FOR D%=0 TO P STEP 16
  60 MOVE 360-D%,256
  70 PLOT 1,D%,D%
  80 PLOT 1,D%,-D%
  90 PLOT 1,-D%,-D%
 100 PLOT 1,-D%,D%
 110 NEXT
 120 ENDPROC
```

Get it right!

10 = F1C9 9		80 = EFAD A
20 = 4670 1		90 = B441 2
30 = 76D7 E		100 = 8F9D B
40 = A56D 1	60 = EDA7 C	110 = 2C83 F
50 = 7164 7	70 = E50B 4	120 = ED0F 7

Listing IV: Shape changer

```
 1000 DEF PROC_DRAW(F%)
 1010 IF F%=1 THEN PROC_INT:PROC_TD(0):E
NDPROC
 1020 IF F%=FL% THEN PROC_TD(1):ENDPROC
 1030 PF=F%/FL%
 1040 N%=1
 1050 X%=FN_T(CX%(0,0),CX%(1,0))
 1060 Y%=FN_T(CY%(0,0),CY%(1,0))
 1070 MOVE X%,Y%
 1080 REPEAT
 1090 X%=FN_T(CX%(0,N%),CX%(1,N%))
 1100 Y%=FN_T(CY%(0,N%),CY%(1,N%))
 1110 IF CX%(0,N%-1)=0 THEN MOVE X%,Y% E
LSE DRAW X%,Y%
 1120 N%=N%+1
 1130 IF CX%(0,N%)=0 THEN N%=N%+1
 1140 UNTIL CX%(0,N%)<0
 1150 ENDPROC
 1160 DEF FN_T(F%,T%)
 1170 =F%+(T%-F%)*PF
 1180 DEF PROC_INT
 1190 DIM CX%(1,130),CY%(1,130)
 1200 FOR P%=0 TO 1
 1210 N%=-1
 1220 REPEAT
 1230 N%=N%+1
 1240 READ CX%(P%,N%),CY%(P%,N%)
 1250 UNTIL CX%(P%,N%)<0
 1260 NEXT
 1270 ENDPROC
 1280 DEF PROC_TD(P%)
 1290 N%=1
 1300 MOVE CX%(P%,0),CY%(P%,0)
 1310 REPEAT
 1320 IF CX%(P%,N%-1)=0 THEN MOVE CX%(P%
,N%),CY%(P%,N%) ELSE DRAW CX%(P%,N%),CY%
(P%,N%)
 1330 N%=N%+1
 1340 IF CX%(0,N%)=0 THEN N%=N%+1
 1350 UNTIL CX%(P%,N%)<0
 1360 ENDPROC
 1370 DATA 320,456, 380,316, 520,256, 38
0,196, 320,56, 260,196
 1380 DATA 120,256, 260,316, 320,456, -1
,-1
 1390 DATA 120,56, 320,56, 520,56, 520,2
56, 520,456
 1400 DATA 320,456, 120,456, 120,256, 12
0,56, -1,-1
```

Get it right!

1000 = F1C9 9		1270 = ED0F F
1010 = 22B4 C	1140 = 88A3 E	1280 = C16A 4
1020 = 681C 8	1150 = ED0F 4	1290 = F44B 8
1030 = 7562 8	1160 = 58D7 B	1300 = 344A E
1040 = F44B 0	1170 = C816 7	1310 = BFBA 6
1050 = 14C3 4	1180 = F3E2 3	1320 = F67A 6
1060 = 646 5	1190 = B45D 6	1330 = E967 9
1070 = D0D3 8	1200 = 4880 7	1340 = DBFB E
1080 = BFBA 0	1210 = 84F7 7	1350 = A010 0
1090 = ACED 7	1220 = BFBA B	1360 = ED0F B
1100 = 8CB7 2	1230 = E967 8	1370 = B76D 0
1110 = F0D3 F	1240 = 2120 9	1380 = 81E9 A
1120 = E967 F	1250 = A010 E	1390 = 3418 3
1130 = DBFB 4	1260 = 2C83 5	1400 = 64E8 6

Listing V: BBC to Owl data

```
 1370 REM DATA FOR TRANSFORMATION OF BBC
 TO OWL
 1380 DATA608,144,608,96,576,48,528,48,4
80,48,448,96,448,144,448,208,448,256,448
,304,448,336
 1390 DATA480,384,528,384,576,384,608,33
6,608,228,0,0,512,352,480,304,480,112,51
2,80,534,80,576,128,576,144,0,0
 1400 DATA576,228,576,304,534,352,512,35
2,0,0,592,144,592,112,550,64,496,64
 1410 DATA464,96,464,320,496,368,550,368
,592,320,592,228,0,0,64,192,144,192,144,
96,64,96
 1420 DATA64,336,144,336,144,240,64,240,
0,0,272,192,352,192,352,96,272,96,272,33
6,352,336
 1430 DATA352,240,272,240,0,0,32,384,160
,384,160,336,192,336,192,288,192,240,160
,240
 1440 DATA160,192,192,192,192,144,192,96
,160,96,160,48,32,48,32,96,32,192,32,336
,32,384,0,0
 1450  DATA16,24,64,24,128,24,192,24,256
,24,384,24,512,24,624,24,624,48,624,128,
624,256
 1460 DATA624,336,624,384,624,408,512,40
8,384,408,256,408,128,408,16,408,16,384,
16,336
 1470 DATA16,256,16,192,16,128,16,48,16,
24,16,24,0,0,240,384,368,384,368,336,400
,336
 1480 DATA400,288,400,240,368,240,368,19
2,400,192,400,144,400,96,368,96,368,48,2
40,48
 1490 DATA240,96,240,192,240,336,240,384
,-1,-1
 1500 DATA382,265,390,282,397,264,414,26
7,431,262,444,278,450,261,459,253,459,25
0,465,230
 1510 DATA464,214,454,205,447,205,449,19
4,437,197,432,205,0,0,447,207,441,213,43
6,216
 1520 DATA433,232,441,245,447,251,456,25
3,0,0,454,229,458,233,459,226,456,226,0,
0,419,253
 1530 DATA425,231,416,206,405,202,392,20
6,388,217,389,245,396,254,404,256,417,25
3
 1540 DATA0,0,418,230,418,230,413,231,41
5,234,417,228,414,229,414,231,414,231,0,
0,466,213,466,213,45?,190,445,175
 1550 DATA422,163,388,155,341,152,341,15
2,0,0,451,182,429,137,471,103,446,106,41
6,122,402,132
 1560 DATA426,92,444,73,411,82,396,98,37
9,124,387,88,398,73,364,104,358,121
 1570 DATA363,71,337,111,337,111,0,0,357
,203,341,180,333,102,315,47,293,23,291,4
7,300,76
 1580 DATA224,24,197,24,290,96,190,64,15
6,64,222,93,289,126,229,115,170,122
 1590 DATA238,131,280,146,257,151,288,16
3,264,163,285,173,261,177,283,186,261,18
9
 1600 DATA283,198,258,218,0,0,266,185,24
3,201,236,223,173,216,171,226,185,229,16
9,241
 1610 DATA186,243,178,255,192,255,188,26
5,205,268,203,281,215,282,265,262,307,27
1
 1620 DATA344,271,382,265,-1,-1
```

Get it right!

1370 = 0 0		1540 = 40B4 7
1380 = 1ACC C	1460 = F866 2	1550 = B000 B
1390 = 69B7 F	1470 = 88BA 7	1560 = 21C 3
1400 = 6395 6	1480 = F5DA 6	1570 = C024 E
1410 = 4EFA 0	1490 = 58BC A	1580 = 6898 E
1420 = 598B D	1500 = FD36 1	1590 = 4C57 C
1430 = 8258 1	1510 = 208C 4	1600 = 59B8 B
1440 = 7AF3 A	1520 = CF04 6	1610 = AA2D F
1450 = ACA9 2	1530 = 4AF6 4	1620 = B23C 7

Listing VI: Transverse wave

```
1000 DEF PROC_DRAW(F%)
1010 VDU5 : MOVE 4,32
1020 PRINT;F%;
1030 FA=(F%/(FL%/2))*(2*PI)
1040 FOR A=0 TO 9
1050 Y=192+SIN(2*PI*((A+1)/10)+FA)+256
1060 X=A*64+16
1070 MOVE X,Y
1080 PRINT;A;
1090 NEXT
1100 ENDPROC
```

Get it right!

1000 = F1C9 9		1070 = F851 D
1010 = 4670 1	1040 = D89B D	1080 = 6568 B
1020 = 76D7 E	1050 = 5A1E 5	1090 = 2C83 9
1030 = 5B10 5	1060 = D292 1	1100 = ED0F 5

Listing VII: Longitudinal wave

```
1000 DEF PROC_DRAW(F%)
1010 VDU5 : MOVE 4,32
1020 PRINT;F%;
1030 FA=(F%/(FL%/2))*(2*PI)
1040 FOR A=0 TO 7
1050 X=32+SIN(2*PI*((A+1)/8)+FA)+32
1060 Y=A*64+48+X
1070 MOVE Y,64
1080 DRAW Y,448
1090 NEXT
1100 ENDPROC
```

Get it right!

1000 = F1C9 9		1070 = 2460 C
1010 = 4670 1	1040 = 3955 3	1080 = 5CD2 5
1020 = 76D7 E	1050 = 18C5 A	1090 = 2C83 2
1030 = 5B10 5	1060 = AE52 E	1100 = ED0F 5

◀ From Page 49

```
  160 FORY%=0TO24:VDU31,0,Y%,134:NEXT
  170 L$=CHR$146+STRING$(38,' '):VDU30
  180 PRINTL$ L$TAB(0,18)L$TAB(0,24)L$;
  190 PRINTTAB(5,1)CHR$131'Crystal Sea b
y Rob Walmsley
  200 VDU28,1,17,38,5
  210 PRINT'Long ago a merchant ship san
k with its expensive cargo of crystals
. Your task, using a droid, is to coll
ect them from the ten sea landscapes.'
  220 PRINT'But beware! An octopus has
made the wreck its home and any contac
t with'
  230 PRINT'it is fatal. A fall of more
than one level is also fatal for your
droid. However it can teleport up and
down the landscape but the octopus can
not.'
  240 VDU28,1,23,38,20
  250 PRINTSPC8'Q - Up/Left'SPC8'A - Do
wn/Left'SPC8'P - Up/Right'SPC8'L - Dow
n/right'SPC4CHR$133'Hit space';
  260 REPEATUNTILGET=32:ENDPROC
  270 DEFPROCI:j%=0:DIMH%(9,9):RESTORE12
80:B$=STRING$(43,' '):B$=':FORI%=1TO43:
READC%:B$=B$+CHR$C%:NEXT
  280 VDU5:Y$=STRING$(10,' '):Y$=':FORI
%=1TO10:READC%:Y$=Y$+CHR$C%:NEXT:DIMG%(9
,9):F%=0:M$=STRING$(10,' '):M$=':FORI%=
1TO10:READC%
  290 M$=M$+CHR$C%:NEXT:DIME%(3,1):FORI%
=0TO3:READE%(I%,0),E%(I%,1):NEXT:E%=0:EN
DPROC
  300 DEFPROCJ:N%=3:U%=0:G%=1:K%=1:D%=FA
LSE:B%=FALSE:S%=-30:O%=8:P%=5
  310 ENDPROC
  320 DEFPROCS
  330 VDU23&E0&00&00&00&03&0C&33&CF&F3
  340 VDU23&E1&08&36&C9&3E&FF&FF&FF&FF
  350 VDU23&E2&00&00&80&60&98&E6&F9&E6
  360 VDU23&E3&00&00&00&00&00&00&80&80
  370 VDU23&E4&AC&D7&AA&D5&EA&35&0E&03
  380 VDU23&E5&FF&3E&C9&76&A8&58&A8&58
  390 VDU23&E6&98&60&80&00&00&03&0C&30
  400 VDU23&E7&80&80&80&80&80&00&00&00
  410 VDU23&E8&E8&3B&0C&00&00&00&00&00
  420 VDU23&E9&C0&00&00&00&00&00&00&00
  430 VDU23&EA&00&00&00&00&03&0C&30&00
  440 VDU23&EB&00&08&36&C1&00&00&00&00
  450 VDU23&EC&00&00&00&80&60&18&06&19
  460 VDU23&ED&53&28&55&2A&15&0A&01&00
  470 VDU23&EE&00&C1&36&89&57&A7&57&A7
  480 VDU23&EF&67&9F&7F&FF&FF&FC&F0&C0
  490 VDU23&F0&17&04&00&00&00&00&00&00
  500 VDU23&F1&10&28&44&82&EE&28&28&38
  510 VDU23&F2&38&28&28&EE&82&44&28&10
  520 VDU23&F3&00&00&18&3C&3C&18&00&00
  530 VDU19,1,4;0;12:RESTORE(1336+U%*50)
  540 FORY%=1TO8:READ H$:FORX%=1TO8
  550 H%=VALMID$(H$,X%,1):H%(X%,Y%)=H%
  560 G%(X%,Y%)=0:NEXT:NEXT:M%=0
  570 FORY%=1TO8:FORX%=8TO1STEP-1
  580 H%=H%(X%,Y%):IF H%=0 GOTO650
  590 L%=FNA(X%-1,Y%):R%=FNA(X%,Y%+1):IF
L%<R%A%=L%ELSEA%=R%
  600 IFA%=H%A%=A%-1
  610 FORI%=A%TOH%-1:PROCR(X%,Y%,I%)
  620 MOVEx%,y%:PRINTB$:NEXT:GCOL0,2
  630 MOVEx%+36,y%-8
  640 VDU243:G%(X%,Y%)=1:M%=M%+1
  650 NEXT:NEXT:READV%,W%,Z%,_%:PROCG(V%
,W%):GCOL0,2:MOVEx%+36,y%-32
  660 VDU241:PROCG(Z%,_%):GCOL0,2:MOVEx%
+36,y%-32
  670 VDU242:PROCF:FORI%=1TON%:MOVE940+I
%*96,1020:PRINTY$:NEXT:READO%,P%:PROCH(O
%,P%):READG%,K%:PROCG(G%,K%):PROCK(G%,K%
):D%=FALSE
  680 B%=FALSE
  690 ENDPROC
  700 DEFPROCO:£%=FALSE:Q%=G%:T%=K%:IFIN
KEY-17 K%=K%-1
  710 IFINKEY-66 K%=K%+1
  720 IFINKEY-56 G%=G%+1
  730 IFINKEY-87 G%=G%-1
  740 IFG%=Q%ANDK%=T%ENDPROC
  750 h%=FNA(Q%,T%):a%=FNA(G%,K%):IFh%-a
%<0 G%=Q%:K%=T%:ENDPROC
  760 £%=TRUE:IFh%-a%>10Ra%=0 D%=TRUE:EN
DPROC
  770 IFG%=V%ANDK%=W%G%=Z%:K%=_%:SOUND1,
3,50,5ELSEIFG%=Z%ANDK%=_%G%=V%:K%=W%:SOU
ND1,4,50,5
  780 IFNOT(G%<10RG%>80RK%<10RK%>8)IFG%(
G%,K%)>0PROCG(G%,K%)
  790 ENDPROC
  800 DEFPROCM:b%=E%:R%=0:e%=FNA(O%,P%)
  810 h%=FNA(O%+E%(E%,0),P%+E%(E%,1)):IF
ABS(h%-e%)>10Rh%=0PROCC:GOTO810
  820 ENDPROC
  830 DEFPROCN:IFO%=G%ANDP%=K%D%=TRUE
  840 ENDPROC
  850 DEFPROCE:VDU4
  860 PRINTTAB(12,10)'G A M E  O V E R':
IFS%>F%F%=S%:PROCA
  870 VDU4
  880 PRINTTAB(10,26)'Press space to pla
y';:REPEATUNTILGET=32
  890 VDU5:ENDPROC
  900 DEFPROCF
  910 VDU23&E0&00&03&0C&10&3F&2E&46&7F
  920 VDU23&E1&00&C0&30&08&FC&74&62&FE
  930 VDU23&E2&40&40&27&27&10&0C&03&00
  940 VDU23&E3&02&02&E4&E4&00&30&C0&00
  950 VDU23&E4&00&03&0F&1F&3D&39&79&7F
  960 VDU23&E5&00&C0&F0&F8&BC&9C&9E&FE
  970 VDU23&E6&7F&2A&29&4A&54&2A&00&00
  980 VDU23&E7&FE&54&94&52&2A&54&00&00
  990 VDU23&E8&00&03&0F&1F&3F&3F&7F&7F
 1000 VDU23&E9&00&C0&F0&F8&FC&FC&FE&FE
 1010 VDU23&EA&7F&7F&3F&3F&1F&0F&03&00
 1020 VDU23&EB&FE&FE&FC&FC&F8&F0&C0&00
 1030 VDU23&EC&00&00&10&7C&FE&7C&10&00
 1040 ENDPROC
 1050 DEFPROCK(X%,Y%):PROCR(X%,Y%,FNA(X%
,Y%)):MOVEx%+20,y%+4:PRINTY$:ENDPROC
 1060 DEFFNA(X%,Y%):IFX%<10RX%>80RY%<10R
Y%>8=0
 1070 =H%(X%,Y%)
 1080 DEFPROCR(X%,Y%,I%):x%=190+(X%+Y%)*
52-X%*4:y%=256+(X%+8-Y%)*24+I%*24:ENDPRO
C
 1090 DEFPROCG(X%,Y%):G%(X%,Y%)=0:PROCR(
X%,Y%,H%(X%,Y%)):GCOL0,1:MOVEx%+36,y%-32
:VDU243:M%=M%-1:IFM%=0 B%=TRUE
 1100 S%=S%+10:PROCA:ENDPROC
 1110 DEFPROCA:VDU4:PRINTTAB(0,0)'Score
:';S%TAB(20)'Hi-Score :';F%:PRINTTAB(0,1
)'Screen:';U%+1:VDU5:ENDPROC
 1120 DEFPROCD:PROCR(G%,K%,H%(G%,K%))
 1130 PROCK(G%,K%):SOUND1,1,150,45
 1140 SOUND0,-15,7,45:FORI%=1TO30
 1150 FORJ%=0TO1:MOVEx%-I%*4,y%+I%*4
 1160 VDU224:MOVEx%-I%*4,y%-I%*4:VDU226
 1170 MOVEx%+I%*4,y%+I%*4:VDU225
 1180 MOVEx%+I%*4,y%-I%*4:VDU227
 1190 NEXT:NEXT:N%=N%-1:G%=1:K%=1
 1200 ENDPROC
 1210 DEFPROCH(X%,Y%):PROCR(X%,Y%,FNA(X%
,Y%)):MOVEx%+20,y%+4:PRINTM$:ENDPROC
 1220 DEFPROCU:c%=O%:d%=P%:O%=O%+E%(E%,0
):P%=P%+E%(E%,1):*FX19
 1230 IF£%PROCK(Q%,T%):PROCK(G%,K%):SOUN
```

Turn to Page 126 ▶

Carswell Computers

24 Elm Road, Faringdon, Oxon SN7 7EJ
Telephone (0367) 21153

TYPEEASY Version 4
- Touch typing course for the BBC B, B+, Master & Electron
- Mistakes displayed with flashing letters
- Teaches correct finger movement
- 139 progressive exercises plus routines for writing more yourself
- Displays errors, speed and performance

Disc (40 or 80 track) £15, Econet disc (80 track) £30, cassette £7.50

TYPE INVADERS
- Increases your speed – we guarantee!
- Letters and words rain down faster and faster – type correct letters to stop them
- 10 levels with 4 speeds plus colour and sound

See review in Acorn User, July '86

Disc (40 or 80 track) £12.50, Econet (80 track) £25, casssette £7.50

Prices include P&P, please add 15% VAT

MAKE YOUR MICRO EARN!

Yes making money with your micro becomes incidental when you know how. Your micro is, if only you knew it, a gold mine. The size and make is irrelevant. Make the initial effort. **NOW** by starting your own **HOME BASED BUSINESS.**

This may be the most important move you will ever make!

REMEMBER: You'll never get rich by digging someone else's "ditch". Anyone in the country, including **YOU**, can become very rich in a relatively short period of time just by doing a few basic things! It's more rewarding than playing games. The benefits are many and varied. Full or part time. For **FREE** details send S.A.E. to:

HOME BASED BUSINESS
31 PILTON PLACE (MU8)
KING AND QUEEN STREET
WALWORTH, LONDON SE17 1DR

BeebDOS version 2.02 (New) from MicroBoss

Software for BBC and IBM file interchange

Runs on IBM-PC-XT-AT or compatibles and supports DOS 2.0 or later
Supplied on 360K IBM diskette with manual and plastic wallet the software includes:

BCOPY	Copy files BBC – IBM, IBM – BBC, BBC – BBC (wild cards allowed)
BCONV	Flexible IBM file translate facility enabling text to be passed between VIEW, WORDSTAR and Displaywrite 3 amongst other uses.
BGRAPH	Display BBC mode 0,1,2,4,5 screen format (AMX Art included) files on IBM standard colour (CGA), enhanced colour (EGA) or Hercules screens for use in IBM PC presentation, DTP, drawing and other graphic applications.

BeebDOS is almost a complete BBC DFS/ADFS for the IBM PC with utilities to catalogue, format, backup, delete, lock, unlock, compact rename, alter title & options, map free space, change and create directories of BBC diskette/files.

In fact BeebDOS is probably the fastest and most powerful BBC/IBM PC file transfer method available and no cables or serial connections are required.

£46 Inclusive of VAT

BBC double density diskette formats supported are Acorn ADFS, Watford, Solidisk, OPUS DDOS and UDM. Acorn single density DFS is only supported when running BeebDOS on an IBM AT or XT286 with a 360k disk drive. Please send or phone for an information sheet

CHEQUE OR POSTAL ORDER TRADE/EDUCATION ENQUIRIES WELCOME
MICROBOSS LTD 3 HADLEIGH RD FRINTON ESSEX CO13 9HG TEL (0255) 671095

Money-Wise + Reports

The ideal solution!

Money-Wise – Replace your manual book-keeping system with Money-Wise. Very easy to input data and correct mistakes. VAT done in a few seconds. Prepares Trial Balance for your accountant. 16k ROM + sample data and book.

Reports – Extends the facilities of Money-Wise even further to provide essential reports on:-
Monthly turnover of ANY account. Monthly gross and net profit, solvency reports. Prepares full accounts and balance sheets. Ideal for financial forecasts, forward planning. Links into wordprocessors. 16k ROM and Book.

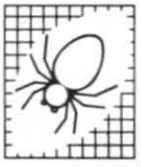
Money-Wise £59.95, Reports £59.95, both (Limited offer) £99.95
Phone for details (0742) 557229

Derbyshire Software, 70 Lees Hall Avenue, Sheffield S8 9JF

REAL TIME CONTROL APPLICATIONS

From Paul Fray Ltd

For School, Business, Home or Laboratory



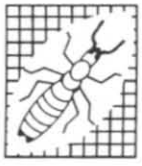
SPIDER The Software

Fifty additional keywords expanding BASIC's control over the User Port, Serial Port and keyboard by invoking BASIC procedures from external events.
- *Foreground/Background processing*
- *ROM/RAM combination takes no memory*
- *Leaves BASIC programs unaffected*
- *Easy to install with no soldering*

— FROM £69 —

Archimedes version – Arachnid Now available

TERMITE The Hardware



- *Eight configurable input/output lines*
- *Status indicators for each line*
- *Outputs rated at 2A, 5 to 30V DC*
- *Opto-isolated and fused for safety*
- *Fully compatible with SPIDER*
- *Comprehensive manual including driver utilities*
- *Ideal for driving motors, lamps, sensors etc.*

— ONLY £115 —

Prices inclusive of VAT. Please add £3 for p&p

We also supply a full range of industrial digital, analogue and serial cards for use with SPIDER. For more information on any Paul Fray product please telephone (0223) 66529

(Trade Enquiries Welcome)

Paul Fray Ltd, Willowcroft, Histon Road, Cambridge CB4 3JD

We offer a unique inspection copy service

NOW RISC OS COMPATIBLE

ARCHWAY

Have you spent long hours struggling with the programming complexities of the brilliant Archimedes **WIMPS** system?

YOU can easily and quickly build multi-window programs for Archimedes with pop-up menus, icons, mouse control, etc. of a professional quality. All in BBC Basic. With RISC OS your programs are multi-tasking and installed on the icon bar.

ARCHWAY provides a total environment for programming with **tools, run-time** code, program **shells**, extensive **examples** and a **library** of functions and procedures.

The **tools** let you define and edit windows, multi-level menus, icons, mouse pointers and much more. The cut, copy and paste, undo, on-line help and hard copy print-out facilities give you power as well as ease of use and convenience.

The **run-time** code becomes part of any program you create. It automatically handles windows, menus, icons, etc. for you. For example, opening a window can involve little more than calling a function with the window's name. Attach a menu name to a window using the tools and the menu functions without you writing a line of code. Give a menu item a command name and when a user chooses it a function in your code with the same name is called. You just write the contents of the function.

An in-depth user guide takes you gently step-by-step through a progressive series of program building examples. All examples are on disc ready to run.

£79.95 incl. VAT & p/p

The complete system comes on 4"800k discs (3 tools & 1 run-time) with a 300+ page, ring-bound user guide. You need 1M of RAM to run the tools. One disc drive is sufficient. No extra licence fee to distribute copies of the run-time in your programs.

AVAILABLE SOON: A Major New Release (V1.1). Many new features; eg powerful graphics and text facilities for your programs by multitasking cooperation with the RISC OS Draw, Edit and Paint programs. **BUY ARCHWAY NOW AND UPGRADE WITHOUT FURTHER CHARGE!**

SIMTRON *Programs to help you*

4 CLARENCE DRIVE, EAST GRINSTEAD, WEST SUSSEX RH19 4RZ Telephone (0342) 328188

Cheques/POs/official orders or Access/Visa number and expiry date. 24-hour 'phone for Credit Card orders.

◀ From Page 124

```
D1,2,1,1
 1240 PROCH(c%,d%):PROCH(O%,P%):ENDPROC
 1250 DEFPROCC
 1260 E%=(E%+1)MOD4:IF(E%AND1)=(b%AND1)R
%=R%+1:IFR%<>3GOTO1260
 1270 ENDPROC
 1280 DATA18,0,0,234,235,236,8,8,8,10,23
7,238,239,8,8,10,240,18,0,1,8,8,11,11,22
4,225,226,227,8,8,8,8,10,228,229,230,231
,8,8,8,10,232,233
 1290 DATA18,3,2,224,225,8,8,10,226,227
 1300 DATA18,3,3,228,229,8,8,10,230,231
 1310 DATA0,-1,1,0,0,1,-1,0
 1320 REM >>> Level Data <<<
 1330 DATA 12345677,11114307
 1340 DATA 00012207,11112227
 1350 DATA 10012007,10002226
 1360 DATA 10000005,11112334
 1370 DATA 1,8,8,1,8,5,1,1
 1380 DATA 77766666,77666555
 1390 DATA 76655544,65544333
 1400 DATA 00000003,00010102
 1410 DATA 00111111,11101110
 1420 DATA 1,8,1,3,8,5,1,1
 1430 DATA 77000077,77600677
 1440 DATA 05600560,05400450
 1450 DATA 23322340,20011000
 1460 DATA 11111011,10101111
 1470 DATA 1,8,8,1,1,7,1,1
 1480 DATA 22210000,22111100
 1490 DATA 01111000,00010000
 1500 DATA 00000011,00011111
 1510 DATA 00110001,00101111
 1520 DATA 4,6,4,4,8,8,1,1
 1530 DATA 07777770,77000077
 1540 DATA 70066007,70666607
 1550 DATA 70666607,70066007
 1560 DATA 77000077,07777770
 1570 DATA 1,7,4,4,5,8,2,1
 1580 DATA 88888888,70008008
 1590 DATA 60000008,50008888
 1600 DATA 45678000,30008006
 1610 DATA 30008006,33307766
 1620 DATA 1,8,5,1,3,5,8,1
 1630 DATA 00888888,00088008
 1640 DATA 00008808,80000888
 1650 DATA 88000088,88800008
 1660 DATA 80880000,88888000
 1670 DATA 3,6,3,1,8,1,1,8
 1680 DATA 88888888,70000008
 1690 DATA 60000008,50222208
 1700 DATA 40200208,30222008
 1710 DATA 22200008,22008888
 1720 DATA 5,4,8,2,5,6,4,1
 1730 DATA 00444400,04400440
 1740 DATA 04400440,00444400
 1750 DATA 04400440,04400440
 1760 DATA 00444400,00000000
 1770 DATA 6,7,3,1,6,1,4,4
 1780 DATA 11045678,11234467
 1790 DATA 01123456,11112340
 1800 DATA 11011233,10011123
 1810 DATA 11000112,11011111
 1820 DATA 8,1,2,7,8,6,7,2
 1830 DEFPROCenv
 1840 ENVELOPE1,4,-4,-1,-1,20,20,20,1,0,
0,0,1,1
 1850 ENVELOPE2,1,2,2,2,5,5,5,126,-20,-2
0,-20,126,0
 1860 ENVELOPE3,129,1,0,0,40,0,0,90,0,0,
-30,90,0
 1870 ENVELOPE4,129,-1,0,0,40,0,0,-90,0,
0,-30,90,0
 1880 ENDPROC
 1890 DEFPROCrel
 1900 IFPAGE=&E00:ENDPROC
 1910 *FX138,0,128
 1920 *KEY0*TAPE¦MFORT%=0TOTOP-PAGE STEP
4:T%!&E00=T%!PAGE:NEXT¦MPAGE=&E00¦MOLD¦M
```

```
 10 =    0 0
 20 =    0 0
 30 =    0 0
 40 = 484A A
 50 = 46AB 9
 60 = AEAB 9
 70 = 92EF A
 80 = 4F7D E
 90 = 60C6 D
100 = 50CD 3
110 = 5F97 A
120 = 505B 1
130 = C09C 9
140 = 9A7B B
150 = 3AE0 C
160 = C31A A
170 = 427B 9
180 = AFED 6
190 = 9564 7
200 = D1E6 F
210 = 857A 7
220 =  F11 2
230 = C5AF A
240 = 9B2B F
250 = EE39 6
260 = 54BD 1
270 = 9DC6 2
280 = D1BE B
290 = C459 C
300 = A587 E
310 = ED0F 7
320 = 38F0 E
330 = 5BDF F
340 = CB5E 6
350 = 34FD 1
360 = ABBF 6
370 = 7F0F F
380 = C67A E
390 = 2E2F C
400 = 4DBD 5
410 = AFC0 8
420 = 98EE 2
430 = EBF1 B
440 = FF37 B
450 = 2807 1
460 = FEC0 8
470 = 78F9 C
480 = 4B58 4
490 = 3658 1
500 = 5508 9
510 = 2CF5 E
520 = 241E E
530 = B6BB A
540 = 807A 4
550 = C551 5
560 = 1126 1
570 = 8626 1
580 = C7F4 7
590 = 6E6D F
600 = 88C7 2
610 = 87B9 A
620 = B6CF 9
630 = C7D9 F
640 = 2F55 3
650 = 13E4 1
660 = 4D39 B
670 = 53D7 C
680 = 1882 1
690 = ED0F 2
700 = 51AF 4
710 = 6196 5
720 = CD00 1
730 =  4BE 6
740 = A5C8 B
750 = 8663 B
760 = 4488 7
770 = 87E6 C
780 = BE21 F
790 = ED0F 7
800 = F82D 1
810 = 6A7C E
820 = ED0F E
830 = E7C3 E
840 = ED0F E
850 = 37C4 5
860 = 496B 2
870 = 765B 4
880 = 7339 9
890 = 7900 5
900 = 7A64 3
910 = 6900 3
920 = 41B4 4
930 = 5DA9 6
940 = 5CAF 7
950 = DC0F E
960 = 111A 9
970 = C4F6 C
980 = 18F6 0
990 = 9185 8
1000 = 5AFF B
1010 = F155 B
1020 = A4C4 E
1030 = CB17 5
1040 = ED0F C
1050 = 29A2 2
1060 = 4342 5
1070 = 3F45 7
1080 = 8C29 D
1090 = B85E 0
1100 = C67A 3
1110 = 3DE4 E
1120 = CA19 F
1130 = CB9D 6
1140 = AB74 5
1150 = D05B 8
1160 = 245A 5
1170 = E77D 3
1180 = B480 4
1190 = F283 4
1200 = ED0F 5
1210 = 11DE 8
1220 = 3492 3
1230 = 532D 9
1240 = E061 D
1250 = 2AC1 8
1260 = F81B D
1270 = ED0F D
1280 = 8D3A B
1290 = 6A2D 4
1300 = 7CDE B
1310 = 3018 5
1320 =    0 5
1330 = 86B9 1
1340 = 2B79 D
1350 = 7AC0 3
1360 = 263E 8
1370 = 689E 7
1380 = D7DE 5
1390 = D05D E
1400 = 49EC B
1410 = A920 6
1420 = D43E 9
1430 = 621B 5
1440 = 18FB 0
1450 = 1433 8
1460 = BAD3 E
1470 =  7D1 1
1480 = 5325 B
1490 = D78B 7
1500 = 3AC9 7
1510 = D8EC F
1520 = 7C9E D
1530 = F9DC 9
1540 = CDFA A
1550 = 2FEE 6
1560 = 918D A
1570 = BFE9 8
1580 = 245F 0
1590 =  17A E
1600 = AE39 9
1610 = CC09 B
1620 = 96A0 E
1630 = 77FF 4
1640 = A063 6
1650 = 3A6D 5
1660 =  9E5 3
1670 = 632D 9
1680 = A19C 7
1690 = E87A A
1700 = 6C26 6
1710 = E8B9 A
1720 = 3FB7 8
1730 = FC0D 9
1740 = 9B65 F
1750 = D590 4
1760 = 2B6E 2
1770 =  BF4 9
1780 = 7E35 B
1790 = E565 6
1800 = F61C 6
1810 = CF07 E
1820 = 9BBA 7
1830 = 2252 6
1840 = 46EA 8
1850 = 15F0 8
1860 = F781 2
1870 = AC41 0
1880 = ED0F 9
1890 = 8B20 2
1900 = E145 F
1910 = 5DEC 5
1920 = 5471 D
```

Dear Trev

Continuing the light hearted Bob and Trev saga with a new look at filling in reader surveys

According to the copy of the Guardian which held my fish and chips the other day – eat your heart out, Edwina Curry – the right to silence is going to be removed. I never knew I had it. Or needed it.

"I know what you're thinking and what you're going to say and you can forget it", Andrea used to announce before I'd uttered a word. Her pre-emptive headaches were little short of clairvoyance. Mind you, my head would ache if I'd done all that bellringing. Some of the others on the team used to say that she went like the clappers – apparently an in-joke among campanologists – so I told them to pull the other one.

Anyway, whatever Parliament does tomorrow The Micro User does today – and ITV Nut User does next month. And what they've done is print a reader survey.

Picture the scene, if you're brave enough. There we were at the Ram and Buffer knocking back the pints of Boddards. Even Doreen was on pints. "Bob's the only half-pint Doreen puts up with", Clive has been heard to say on more than one occasion. In fact it's hard to think of an occasion when Clive hasn't said it.

Anyway, I digress – a habit which I've resolved to break (as all the brackets and dashes get confusing – like this). There we were, all involved in a heavy nostalgia session – you know, the kind that starts in a rosy glow with "Remember the cassette bug fix?" and end up with yells of "Tha knows nowt" and arguments as to which month's listings had the most mistakes.

It was towards the end of one of these sessions – first Rogue: "Micro User isn't what it used to be", second Rogue: "Thank God" – that Doreen came across the reader survey underneath her scampi (at least that's what she called it) and we decided that she should fill it in as a representative of the Romchester Rogues. It was a decision in the great British tradition of the Light Brigade, the Titanic and the Electron.

At first she said she didn't like question papers that didn't give the marks, but eventually we persuaded her by saying that all the replies went into a draw and the winner got a plastic inflatable Mike Cook. With that prospect there was no holding her. (Not that there is much prospect of holding her nowadays, she seems to have got the Andrea syndrome. Next thing I know she'll be ringing bells.)

At the top it said You don't have to a fill in an answer if you don't want to. "That's big of them", opined D. as she searched for a pencil with some lead in it. "Let's have a go". With that she settled down to fill it in.

"How old are you? What business is it of theirs?" she bristled (I've been meaning to talk to her about that). Eventually we persuaded her to put down 21 and keep quiet about the base and after running the gauntlet of Sex? – a "Yes" from Clive and "Why do they put M/F and not F/M?" from Doreen – we got on to the next set of questions where we had to tick squares according to our level of interest in a series of subjects.

"Oh, it's a dot-to-dot! I like these", D. enthused, filling in the boxes to make a pretty pattern. Happily I had a rubber – I've found that it's always worthwhile carrying one when Doreen's around – and we soon had the survey back to its pristine state.

The idea was to score the subjects from zero to five. Doreen put down a zero for Desktop publishing as it reminded her of school, but everyone agreed that we should put down five for Future tech on the grounds that we were all keen to find out what it meant.

The answer to How do you rate your knowledge of the following subjects? was "More than I rate yours" while we lied and said that we had both a Z88 and an Archimedes on the grounds that we all love reading about things we don't have – Clive calls it the Page Three syndrome

I daren't repeat the response to the question about sideways ram though I thought Doreen's reply of "The operating system" to What software do you use most frequently? was brilliant. We decided that we used our micros for keeping our home accounts and a list of recipes with other uses only limited by our imaginations.

At this point we became a little creative and started asking our own questions. Never mind whether there's any software we've bought and never used. Surely the important point is have we ever bought any software in the first place? Clive admitted to buying a disc copier once, but said that after that he'd never seemed to need to buy other programs.

The question about how long we'd been reading the magazine threw us – there must be some slow readers out there if they take two to three years. And blood was drawn over what we liked least. That was funny as we had no problem about what we liked best, though modesty forbids. And if they ask for Any other comments, they deserve what they get.

"Well", I said as I staggered to the post box," this'll give the lads at The Micro User something to think about".

"Will it?" asked Doreen with a funny expression on her face. "Take a look at the address".

I did. There, on the envelope just under Reader Survey 1989 (I can't remember the 1,988 previous ones) was the address – of Nut Abuser. I don't understand. But then that's often the case.

Yours,

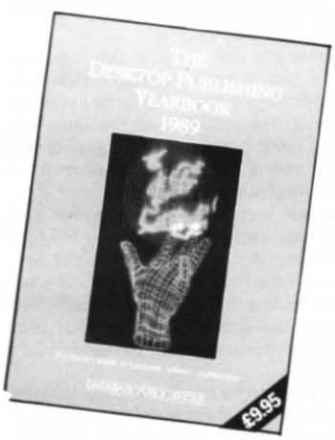
Bob

PS. We also suggested a new bodybuilding project – attaching an Electron to the dashboard of a Sinclair C5.

EVERYTHING YOU NEED TO KNOW ABOUT DESKTOP PUBLISHING

ONLY £9.95

The Desktop Publishing Yearbook 1989 is an invaluable buyer's guide containing the most detailed survey available of hardware, software and services in the electronic publishing field.



And there are clearly-written "how-to" articles for both the newcomer to Desktop Publishing and the experienced user.

Articles cover single-user and multi-user publishing systems, publishing software, laser and other electronic printers, matrix printers, digitisers and scanners, computer typesetting, magazine and newspaper composition, documents and forms creation, bureau services, word processors, and many other key topics.

Whether you're a beginner or professional and would like to find out more about the exciting possibilities of DTP, then this book has all the information you need. Send for your copy today!

TO ORDER YOUR COPY, PLEASE USE THE FORM ON PAGE 119

BOSS OF YOUR OWN COMPANY?

Would you like to be boss of your very own, highly successful home-based business? Using an ordinary home computer (make unimportant) and with the help of our guide, you could very soon be earning more money and enjoying more success than you ever thought possible. This is an ideal low cost, no risk way to start in business.

Why delay the realisation of your ambitions? Take this first positive step towards your self-fulfilment and prosperity - send today for your copy of **MONEY FROM YOUR MICRO,** cheque or postal order for £12.95p payable to

MOSS PUBLICATIONS
P O BOX 52
BARNSLEY S75 5PZ

You could be in business VERY soon.

ONLY POOLS AND HORSES

FOOTBALL BOXFORM £14.95 (+£2 for 3" disc)

- The **ONLY** pools program written by a **GENUINE EXPERT** who has been professionally employed as such by the leading pools company.
- The **ONLY** program dealing with football form that has its team merit ratings published in a national sporting magazine.
- The **ONLY** program that uses machine code and advanced statistical methods to analyse football form. Lists homes aways and draws in order of merit and gives true odds for every match. Covers league & non-league clubs
- The **ONLY** program to claim **50% MORE DRAWS** than obtained by chance.

BOXFORM & HANDICAP WINNER £14.95 (+ £2 for 3" disc)

Two programs for the price of one. Easy to use and they never go out of date. All you need is a few minutes with a daily paper. **BOXFORM** weighs up a race by considering the many facets of form. Easily amended to suit the user's ideas. **HANDICAP WINNER** shows the value for money bets. **OVER 500 WINNERS** in handicaps this year at prices up to 25/1.

SPECIAL PRICE of £24.95 (+£2 for 3" disc) for all of the above programs

RACING TOOL KIT £49.95 tape or disc

A package of 7 programs for the racing enthusiast. BOXFORM & HANDICAP WINNER plus programs to produce ratings and time figures, update private handicaps or form your own, keep records, work out almost any bet etc. etc.

Why pay inflated prices? **BOX**oft **CLEVER** and get the **BEST**

Available on tape or disc for SPECTRUM, CMD C64/128, AMS CPC's, BBC B. from:

BOXOFT (MU), 65 Allans Meadow,
Neston, South Wirral L64 9SQ.
Credit card holders may phone 051-336 2668 (24 hrs)

ACORN APPROVED
LONDON DEALER

Wide range of software and hardware stocked

Good prices

Easy to get to
Train: WOOD ST Station (British Rail)
Road: Bottom of M11, just off North Circular
Tel No: 01-521 1784

AUTOMATIC SERVICES
217 WOOD STREET
WALTHAMSTOW
LONDON E17 3NT

Sciways for Scientists

- Over 350 defined characters accessible with simple 2-key codes
- All characters printable on both screen and printer
- User defined characters can be stored on disc
- All facilities can be used with word processors or with BASIC
- Tested with BASIC I & II, Wordwise, Wordwise Plus, View 2.1, View 3.0, on the Master 128, B+ & Model B, and with Epson/compatible printers

GREEK ALPHABET: Upper and Lower case, upright and italic

SCIENTIFIC CHARACTERS: Mainly mathematical but also chemical symbols

Orders accepted from schools, colleges, establishments, etc.
Private orders – cheque with order, please

PRICE £39.95 inc VAT, p&p
16k ROM, 40/80 disc & manual
(not compatible with Inter-Word)

Mayhew Telonics,
376a Ringwood Road,
Poole, Dorset BH12 3LT
Tel: (0202) 747695

NEW! TEN of the BEST EDUCATIONAL GAMES

Packed full of some of the best educational games available for the BBC Micro, the new Ten of the Best Educational Games is the ideal way for your children to learn about maths, spelling, anagrams, telling the time, general knowledge, and even the rudiments of running a business!

Specially compiled by the *Electron* and *Micro User*, teams to give a good ground in all aspects of learning, and at the very special price of only £5.95 on tape, or £6.95 on disc, this collection is a treat you and your children cannot afford to miss!

Give your children hours of fun, and help them to learn the easy way by ordering your copy today.

THE PROGRAMS

Company Count – Work your way up through the company starting off as a messenger, and ending up as president!

Hungry Harry – Find out what it's like to be an assistant in a busy shop. Can you work out the correct change to give the customers?

Lemonade Stall – Try your hand at running a lemonade stall at a popular seaside resort.

Dozer Disorder – Fill in the missing letters after they are bulldozed into a pit.

Crocodile – Unscramble the letters of a word before the crocodile gets you.

Snail Trail – See how good you are at general knowledge in this trivia quiz.

Hiss – Improve your spelling by guiding a snake round the garden eating up words in the right letter order.

Maths Fun – Test your powers of mental arithmetic.

Odd One Out – Pick the object that doesn't fit from the list of five.

Yule Spell – Guess the hidden word or you'll lose your Christmas presents!

Tape	Disc
£5.95	£6.95

Order your copy today, using the form on Page 119

512 users

Solve your compatibility problems using DOS+ Problem Solver

It enables the 512 board to run most IBM-PC programs that otherwise wouldn't run, emulates the missing keys that BBC model B users don't have and allows the saving of high-res screens from any program.

PRICE: £24.95 (including program, user manual and 1 year free user support)

"What a great program Problem Solver turned out to be.
... if you have a program that you use at work on the office PC and you want to get it up and running on your model B or Master, it will seem worth it to you.
And if you want to play PC games, then you really will notice a difference."
BBC Acorn User , May 1989, pages 129-130 (editorial review)

Lots of programs like Cat, Jet, Digger, Artwork's Strip Poker, ELECTRONIC ART's Golf, Driller, Dark Side, Impact, Charlie Chaplin, Test Drive, Infiltrator, StarQuake, Bushido, Tennis, Frogger, all versions of MicroSoft's Flight Simulator, Orbit, 688 Attack Sub, Defender of the Crown, Quadralien, Yes Chancellor, Ancient Art of War, Adventure Writer, Dream House, AFT, Droege, Dream, Delux Paint 2, Fontasy 2.08, News, PC Tutor, Lotus 123 2.0, Turbo Calc, Mandelbrot Generator, Prospero Pascal, Turbo Pascal 4.0, Turbo C 1.5, Turbo Prolog, Prolog2, PC File+, Galaxy, Trendex/2, Homebase 2.15, Mindreader, DBASE III plus, Pipedream, and many more will run like on an ordinary IBM PC.

Available from Shibumi Soft, R. Prof. Camara Sinval 138, 4100 PORTO - PORTUGAL.

Payment can be made with an ordinary English cheque. Please add £3 for postage and packing.
Faulty disks will be replaced.

EUROWORD

for WORDWISE and WORDWISE PLUS

Converts Wordwise to a European wordprocessor. Provides French, Italian, German, Scandinavian and Spanish characters grouped into five sets. For example.

French/Ital	German	Spanish
à ç é è ù ò ì	Ä Ö Ü ä ö ü ß	Pi Ñ č ñ ç

Additional accented characters are easily produced by overprinting a UK character with an accent as in ê. Euroword supports a range of printers including Epson type dot-matrix, Diablo 630 printwheels and the IBM extended character set.

"Wordwise-using modern language teachers should fall on Euroword gratefully" – Times Educational Supplement, 3 Feb 89.

Charm Micro Soft
10 Hall Lane,
Longton, Preston.
PR4 5XB. 0772-616705

Euroword is supplied on disc. A backup disc and 40 page manual are included. Price £14.90 inclusive. Please specify your printer and 40 or 80 track disc.

MUSIC PROGRAMS

★ PLAYBEEB £7.95 *Fun for 3-7 year olds*
★ RECOMPOSER
★ RHYTHM TUTOR } £12.50 each. *Enjoyable and educational programs for a wide range of abilities*
★ PITCH TRAINER
★ MUSIC PROCESSOR £54.95 *High quality music printout plus much more!*

Available on 40 or 80 Track disc for BBC B or MASTER
Send for more details to:-

Mid-Sussex Software

11 BRIDLE WAY, POUND HILL, CRAWLEY, RH10 4HP.
TEL. (0293) 882130

ADVERTISERS' INDEX

4mation 62
Ampsound 108
Apricote Studios 130
Automatic Services 128
B&S Computing 59
Beebug 6,8,10,13
Bonex 73
Boxoft 128
Care Electronics 80
Carswell Computers 125
Charm Micro Soft 130
Circle Software 98
Clares 54,78
Computech 120
Computeck 40
Computer Concepts 26,102,103
Computer Shopper Show 35
Contex Computing 72
Dabhand Computing 114
Database
Educational Software 22,115
Dataplex 72
Datastore 62
Denham Computer Products 120
Derbyshire Software 125
Electro Music Research 69
Home Based Business 125
Impact 47,131
Integrex 79
Mach Technology 16,17
Manor Court Supplies 65
Mayhew Telonics 128
M D Office Supplies 24
Meadow Computers 108
Microboss 125
MicroLink 44
Micromedia 69
Mid Sussex Software 130
Mijas Software 120
Minerva 14,38
Morley Electronics 3
Moss Publications 128
Norwich Computer Services 110
Paul Fray 125
Pineapple Software 56
PRES 20
Selec Software 120
Shibumi Soft 130
Silicon Vision 15
Simtron 125
Stellar Enterprise 72
Superior Software 2,132
Swift Software 43
Technomatic 53
TK Computerware 80
VMS Enterprises 69
Watford Electronics 83-97
Weserve 68

'THIS IS THE BUSINESS'

THE ACCOUNT BOOK
The easiest to use accounting system for the BBC/Acorn range. How do we know? Simple, dozens of letters from satisfied customers. Unlimited entries, automatic date order, dozens of reports, full vat facilities.
Just £27.95. (See review in Beebug Vol. 7, No. 5 + Micro User July '89)

And now: THE INVOICE PROGRAM
700 customer database. Very neat invoices with huge description space (max. approx. 2000 words!), Unpaid or Paid - database or one-offs - on continuous/single paper (for use with your own letterheads if you want - any size). Part/paid invoices. Automatic statements. Credit notes. User specified messages, credit terms, overdue messages, 100 stock description labels. Full vat facilities. Instant customer credit details, full linking with The Account Book and much, much more.
Amazing value at £27.95. You will not be disappointed.

Both the above programs can be used independently or linked together.
Special offer price for both £49.95
Order by phone, coupon or send for the fact sheets.

Please tick:
☐ 5.25" disc ☐ 3.5" disc ☐ ADFS ☐ DFS
☐ 80 track (minimum 1 double sided drive)
☐ 40 track (minimum 2 single drives)
☐ Account Book £27.95 ☐ Invoice Program £27.95 ☐ Both £49.95
Name: .....
Address: .....
.....
Post Code: ..... Telephone: .....
Access Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Signature .....
Please send order to Apricote Studios, 2 Purls Bridge Farm, Manea, Cambs, PE15 0ND or telephone 035 478 432 with your Access card number/enquiry.
All orders sent by return of post.

FREE 8 PAGE CATALOGUE

Send a stamped addressed envelope for your copy

FREE HELPSHEETS/MAPS

Spend over £4 on games and you may choose **ONE** of the following helpsheets/solutions and maps absolutely **FREE**.
Spend over £10 and you may choose any **TWO FREE** :-

Pipeline (Helpsheet + 4 maps)	Arthur 7 (Solution)	Hoverbod (Passwords + cheats)
Village of Lost Souls (Helpsheets)	Exile (Helpsheet)	Frak! (Helpsheet)
Impact Jokers (Lots of jokes)	Firelance (Solution)	Thunderstruck 2 (Solution + map)
Impact Jokers 2 (Lots more jokes)	The Hobbit (Solution)	Kourtyard (Helpsheet + map)
Shark (map)	Citadel (Solution + map)	Dynusty (Helpsheet + 25 maps)
Spindizzy (Solution + map)	Elan (Solution + map)	Gnbusmes Castle (Solution + map)
Plan B (Solution + map)	Sky Vs Spy (Helpsheet)	Palace of Magic (Solution + map)
Zarch (Helpsheet)	Spellbinder (Solution + maps)	Impact (Helpsheet's password)
Stryker's Run (Solution + map)	Ulan (Solution + maps)	Icarus (Helpsheet + maps)
Ziggy (Solution + maps)	Paperboy (Helpsheet)	Sphinx Adventure (Solution + map)
Future Shock (Solution + maps)	Twin Kingdom Valley (Solution + maps)	Anarchy Zone (Helpsheet + password)
Aviaxil (Solution + map)	Omega Orb (Solution + maps)	Region 2 (Helpsheet + 16 maps)
Return of R2 (Map + tips)	Elite (Helpsheet + tips)	Scmacruncher (All passwords + maps)
Bug Eyes 2 (Map)	Terrahawks (Solution + Map)	Skymash (Helpsheet)
Mysonn (Solution)	Stranded (Solution)	Chelo (Solution)
The Lost Crystal (Solution + maps)	Codename: Droid (Solution + map)	Quest for Freedom (Solution + map)
Imogen (Solution + 16 maps)	Sentinel/Sentinel (Solution)	Starglyph (Solution)
Quest (Solution + map)	Suds (Solution)	Starquake (Helpsheet)
Ravenskull (Solution + 4 maps)	Philosopher's Quest (Solution + map)	Rick Hanson 2 (Solution)
Last of the Free (Solution + map)	Rick Hanson (Solution)	The Hunt (Helpsheet + map)
Starglider (Helpsheet + map)	Thrust (Maps)	Sabre Wulf (Helpsheet + map)
Corruption (Solution)	Last Ninja (Solution + maps)	
Gotten Figurine (Solution + maps)	Exile (Helpsheet - Part 2)	

WHITE MAGIC (The Fourth Dimension)

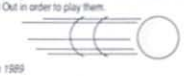
Following the immense success of Holed Out, The Fourth Dimension have now released a unique new fast-action arcade adventure called WHITE MAGIC. You can at any time transform into a Leprechaun, Enchanter, Titan or Warrior in order to use their much needed varied abilities. A sure-fire hit.

BBC/Electron Cassette £9.95 BBC B/Master 5 1/4" Disc £12.95
Enhanced Archimedes 3 1/2" Disc £19.95

ARCHIMEDES GAMES

White Magic (The 4th Dimension)	19.95	Word Up & Word Down (Gem)	16.95	Freddy's Folly (Minerva)	11.95
Holed Out (3D Golf) (The 4th Dimension)	19.95	Pacmania (Grandslam)	15.95	Alerion (Dabs Press)	12.95
Holed Out Extra Courses Vol 1	16.95	Repton 3 (Superior)	15.45	Terramex (Grandslam)	15.95
Holed Out Extra Courses Vol 2	16.95	Jet Fighter (Minerva)	11.95	Zarch (Superior)	15.45
Cheat It Again, Archie (Impact Software)	9.95	Corruption (Rainbird)	19.95	Hoverbod (Minerva)	11.95
Quazer (Impact Software)	9.95	Fish (Rainbird)	19.95	Missile Control (Minerva)	11.95
Startrader (Gem)	16.95	Fireball (Godax)	15.95	Thundermonk (Minerva)	11.95
		Orion (Minerva)	11.95	Minotaur (Minerva)	11.95
		3D Pool (Firebird)	16.95	Ibix he Viking (Minerva)	16.95

HOLED OUT EXTRA COURSES

Due to overwhelming public demand The 4th Dimension has now produced 2 volumes of extra courses for their superb 3D golf game Holed Out. Each volume contains 2 superbly designed brand new courses plus the original Holed Out program; therefore you do not need the original Holed Out in order to play them.

"I play golf and this game is the closest thing I've seen to the real game on a computer". *Archive, June 1989*
"I wouldn't have thought it possible to get a better simulation out of the beeb." *BBC Acorn User, June 1989*
"The 3D perspective graphics are stunning" *Electron User GOLDEN GAME June 89*
"Holed Out is great.....The game plays very well and the graphics are superb." *Popular Computing Weekly, March 1989*
"The best golf simulation I've ever seen on any Acorn machine." *The Micro User, June 1989*
"The Electron version is brilliant - it's almost the same as playing at Gleneagles. Unreservedly recommended." *A & B Computing Game of the Month, June 1989*

Prices above and opposite

ARCADE SOCCER (The Fourth Dimension)

A brilliant soccer game of the quality that only The Fourth Dimension could produce. Superb graphics, League System, throw-ins, corners, diving goalies, superfast action and much, much more. It's as near to the real thing as you can get. "HIGHLY RECOMMENDED". You can play against the computer or a friend.

BBC/Electron Cassette £9.95 BBC B/Master 5 1/4" Disc £12.95
Enhanced Archimedes version will be available late October at £19.95

The Art Studio from Impact Software

from only £9.95

An ingenious and comprehensive design program from Impact Software allowing you to create superb pictures and save them to cassette or disc. It features a host of easy to use commands such as Zoom, Paint, Fill, Copy etc, to help any budding artist. No roms, chips, mice or other add-ons are required. Just load and go! Keyboard or joystick controls. Works in modes 4 & 5. This must be the best value utility on the market today.

Prices opposite

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc	Master Compact 3 1/2" Disc
M = Master Compatible			
IMPACT SOFTWARE (Discs are BBC B & Master Compatible 40/80)			
The Art Studio M	9.95	12.95	14.95
Orbital M	4.95	5.95	6.95
Cheggar M	4.95	4.99	6.95
Zenon M	4.95	4.99	6.95
Cheat It Again, Joe 1	2.99	4.99	-
Cheat It Again, Joe 2	2.99	4.99	-
Cheat It Again, Joe 3	2.99	4.99	-
THE FOURTH DIMENSION			
Holed Out (3D Golf) M	9.95	11.95	12.95
Holed Out Extra Courses Vol 1 M	9.95	11.95	12.95
Holed Out Extra Courses Vol 2 M	9.95	11.95	12.95
White Magic M	9.95	12.95	13.95
Arcade Soccer M	9.95	12.95	13.95
SUPERIOR			
Question of Sport M	9.50	11.50	15.70
Play It Again Sam 6 M	6.90	-	-
Last Ninja M (BBC Only)	-	-	11.25
Play It Again Sam 5 M	-	-	11.50
Sky Fox Means or Fox! M	6.90	8.90	11.25
Play it Again Sam 4 M	7.25	9.50	11.50
Pipeline M	6.90	8.90	11.25
Repton Thru Time M	5.50	6.50	7.50
The Life of Repton M	5.50	-	7.50
Elixir M	6.90	-	9.95
Repton Around the World M	5.50	-	7.50
Quest M	6.90	-	-
Elite M	9.45	11.45	15.75
Acornsoft Hits 1 M (BBC Only)	3.99	-	11.50
Acornsoft Hits 2 M	2.99	-	11.50
TYNESOFT			
Superspy M	6.90	10.95	-
Circus Games M	6.90	10.95	-
Summer Olympiad M	6.90	11.25	11.25
Sargon M	7.25	-	-
Spy vs Spy M	7.25	-	-
Indoor Sports M	7.50	11.95	-
Future Shock M	-	11.95	11.95
GODAX			
Skimash M	4.95	6.95	6.95
Kourtyard M	5.95	6.95	6.95
A + F			
Chuckie Egg	3.99	-	-
ACORNSOFT			
Aviator (BBC Only)	3.99	-	-
Revs & Revs e Tracks (BBC B Only)	3.99	-	-
Revs (BBC Only)	-	6.95	-

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc
M = Master Compatible		
ASL		
Shark M	7.25	9.25
Breakthrough M	4.95	7.95
Impact M	7.25	9.50
Powerpack 2 (Elec Only)	5.95	-
Ransack M	7.50	9.50
Thunderstruck	4.95	-
Thunderstruck 2	4.95	-
Sphere of Destiny M	5.95	9.50
Omega Orb M	-	5.95
BEAU JOLLY		
Five Star Games 1 (5 games)	3.99	-
Five Star Games 2 (5 games)	3.99	-
Five Star Games 3 (7 games)	7.25	-
Computer Hits 2 (BBC Only) (10games)	3.99	-
Com' Hits 3 (10 games) (Elec Only)	4.95	-
Computer Hits 4 (12 games)	7.25	-
Computer Hits 5 (5 games)	3.99	-
BUGBYTE		
Bugbyte Comp 1 (4 games) M	-	4.99
Bugbyte Comp 2 (4 games)	-	4.99
Dunjunz M	2.99	-
CDS		
Tank Attack M	9.95	11.95
Football Director M (BBC Only)	7.50	10.95
Colossus Bridge M	10.95	12.95
Colossus Chess M	7.50	10.95
Steve Davis Snooker M	1.99	4.99
Brian Clough Football M	5.95	7.95
DATABASE SOFTWARE		
Mini Office	4.95	-
Starcpake (BBC Only) M	7.50	9.50
Mini Office 2 (BBC B Only)	12.95	14.95
Mini Office 2 (Master Disc)	-	15.95
Fun School 2 M	-	-
Under 6's M	7.50	9.95
6 to 8 Years M	7.50	9.95
Over 8's M	7.50	9.95
DOCTORSOFT		
Phantom Combat M	2.99	4.99
DOMARK		
Empire Strikes Back (BBC Only) M	6.90	9.70
Not a Penny More (BBC Only) M	6.95	9.70
Star Wars M	6.90	9.70
Return of the Jedi (BBC Only) M	6.90	9.70
Trivial Pursuits (All BBC Only)	-	-
Genus Edition M	12.50	15.95
Baby Boomer M	12.95	16.95
Multi Eye (BBC Only)	7.50	-
Countdown (BBC Only)	7.50	-
Bloodbusters (BBC Only)	7.50	12.95

TITLE & PUBLISHER	BBC or Electron Cassette	BBC 5 1/4" Disc
M = Master Compatible		
EPIC SOFTWARE		
The Lost Crystal (BBC Only)	6.95	-
ELK ADVENTURE CLUB		
Starship Quest	3.95	-
Magnetic Moon	3.95	-
FIREBIRD		
Sentinel (BBC Only) M	7.25	-
Chelo (BBC Only) M	7.95	15.95
3D Pool	7.95	9.95
GREMLIN GRAPHICS		
Kwiksilver (BBC Only) M	6.95	9.95
INCENTIVE		
Moon Cresta (BBC Only)	1.99	4.99
MANDARIN		
Lancaster (B2 Track Only BBC B with sideways/shadow RAM, B+, Master) M	-	11.95
Icarus M	7.50	9.95
Time and Magik (B2 Track Only (BBC B with sideways/shadow RAM, B+, Master) M	-	11.95
MARTECH		
Tarzan (BBC B Only)	-	4.99
War (BBC Only)	-	3.99
MASTER GAMES		
Scott Adams Scoops (BBC Only)	6.95	-
MICROPOWER		
Imogen M (B2 Track Only)	-	9.50
Micropower Magick 1 (BBC Only)	4.95	-
Micropower Magick 2 (BBC Only)	4.95	-
Shockaze (BBC Only)	-	6.95
MIRRORSOFT		
Mastermind & Cluedmaster	2.99	-
Tetris M	2.99	4.99
Spitfire 40 M	5.95	-
Strike Force Harrier	3.99	-
ROBICO		
Rick Hanson Trilogy (BBC Only) M	17.95	-
Mysterm M	6.95	12.95
The Hunt (BBC Only) M	7.95	-
U.S. GOLD		
Rebel Planet (BBC B Only)	4.95	-
Temple of Terror (BBC B Only)	4.95	-
WHITE PANTHER		
Infinity (BBC Only) M	7.50	11.95

BUDGET TITLES

BBC B or Electron Cassettes

ALL ONLY £1.99 EACH

Alien Dropout (Elec Only)
Anarchy Zone
Bar Billiards
Bibbley (Elec only)
Boxer (Elec only)
Chess (Elec only)
Creepy Cave
Dambusters
Darts
Deathstar
Flight Path 737 (Elec only)
Frankenstein 2000
Gnbusmes Castle
Golden Figurine
Golf
Graham Gooch Cricket (Elec only)
Grid Iron
Gunsmoke (Elec only)
Hyperdrive (Elec only)
Indoor Soccer (Elec only)
Invaders (Elec only)
Jetpac (BBC only)
Joe Blade 1
Joe Blade 2
Last of the Free
Magic Mushrooms (BBC only)
Monkey Nuts
Moon Cresta (BBC only)
Mr Wiz
Nuts (BBC only)
Panic
Pegleg (Elec only)
Percy Penguin
Peter Scott Trilogy (BBC only)
Psycastria
Round Ones
Smash and Grab
Snapper (Elec only)
Snooker (BBC only)
Soccer Boss
Starship Command (Elec only)
Steve Davis Snooker
Stormcycle
Styx
Superpool (Elec only)
Swoop
Tempest
Tha Boxing (Elec Only)
Triple Decker 1 - 10 (1.99 each)
UK PM (Elec only)
Video Card Arcade
Wet Zone (Elec only)

ALL ONLY £2.99 EACH

Acornsoft Hits 2
Arcadians (Elec only)
Beachhead (BBC only)
Citadel
Commando
Cruzes Rider
Cricket
Croaker
Dragna (BBC only)
Dunjunz
Felix in the Factory
Felix / Fruit Monsters (Elec only)
Football Manager
Footballer of the Year
Frenzy (Elec only)
Galahrrow
Ghouls (Elec Only)
Hopper (Elec only)
Hunkidory
Karate Combat
League Challenge
Megarack (BBC only)
Meteors (BBC only)
Mr Ee (BBC only)
Phantom Combat
Plan B
Plan B2
Pro Golf
Ravenskull
Region
Region 2
Roberto
Rocket Raid (BBC only)
Sphinx Adventure (Elec only)
Squeakalizer
Star Force Seven
Strykers Run
Sunsworld
Syncron
Tennis
Thrust
Turf Form
Twin Kingdom Valley
Uranians
Warehouse

IMPACT NEWSLINE

For the very latest news ring: 0898 654334

25p per minute cheap rate; 38p all other times
(if you are using your parents phone please ask for their permission first)

Now updated every week, the newsline is a superb way of keeping up to date with the latest releases, games news, bargains and the top 5 best-selling games of the week.

SIMPLY FILL IN THIS COUPON AND SEND A CHEQUE OR POSTAL ORDER TO IMPACT SOFTWARE.

- All games despatched by 1st class post.
- **FREE** postage and packing (U.K.only).
- Despatch normally same day as order.
- Minimum orders £3.00.
- Telephone orders welcome.

TELEPHONE ORDERS WELCOME

Access VISA

(0742) 769950

IMPACT Software

Impact Software
Neepsend House
1 Percy St
Sheffield S3 8AU

To: Impact Software, Neepsend House, 1 Percy St, Sheffield, S3 8AU
Please send me the following :-

TITLE	FORMAT (Cassette etc.)	COMPUTER	PRICE

(We cannot accept orders for less than £3.00)
* I enclose a cheque/P.O. or :
* Debit my Access/Visa card account :

TOTAL COST..... £

(BLOCK CAPITALS PLEASE)

Name.....

Address.....

Postcode.....

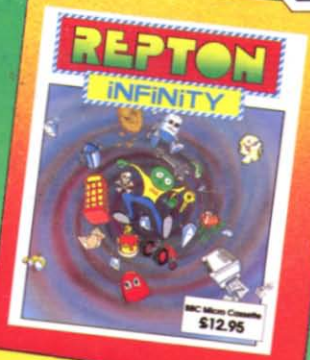
Please send me **FREE** helpsheets/solutions/maps for the following games (from those above)

1.....(Orders over £4)

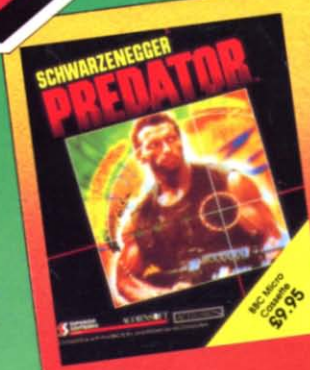
2.....(Orders over £10)

SUPERIOR SIX

Barbarian II
The Barbarian and Mariana Fight the Monsters in the Dungeon of Drax - 80 action-packed screens on four levels with 20 fearsome monsters to defeat.
"A most impressive and playable game" - Acorn User



Repton Infinity
The Ultimate Repton - Four Games and a Game Creator.
"Repton Infinity would be excellent value for the games alone, but you can have much more fun by experimenting with the game creator" - Micro User



Predator
Nothing like it has ever been seen before! You've heard about the Schwarzenegger film PREDATOR... now you can play the leading role. Fight your way through the South American jungle - but beware the mysterious alien who keeps taking out your men.

Play It Again Sam 8
Top Hit Four-Game Compilation - One of the greatest sporting simulations ever, combined with three of Superior's best-loved games. WINTER OLYMPIAD 88, QUEST, AROUND THE WORLD IN 40 SCREENS, MR. WIZ.

Play It Again Sam 9
A Four-Game Compilation that will Test Your Arcade Skills to Their Limits - Featuring a brand-new release and three recent smash hits. CAMELOT, STEVE DAVIS SNOOKER, SPYCAT, THE LIFE OF REPTON.

Play It Again Sam 10
A Superb New Four-Game Compilation - Features an award-winning classic game, a top-quality brand-new release and two recent smash hits. Great value for money. ZALAGA, QWAK, 3D DOTTY, REPTON THRU TIME.

SUPERIOR SOCCER

NEWS FLASH

Superior Software now proudly presents SUPERIOR SOCCER, the best soccer game ever for the BBC Micro and Acorn Electron computers.

SUPERIOR SOCCER is a superb game, which combines the best graphical features of arcade soccer games with the best strategic features of football manager games.

BBC Micro Cassette.....$9.95
BBC Micro 5¼" Disc.....$11.95
Acorn Electron Cassette.....$9.95
BBC Master Compact 3½" Disc.....$14.95

Send in your order now and be the first with the greatest! Get the best, accept no substitutes!

24 HOUR TELEPHONE ANSWERING SERVICE FOR ORDERS

Please make all cheques payable to "Superior Software Ltd".

SUPERIOR SOFTWARE Limited

ACORNSOFT

(Acornsoft is a registered trademark of Acorn Computers Ltd. Superior Software Ltd is a registered user.)

Dept SSX2, Regent House, Skinner Lane, Leeds LS7 1AX. Telephone:(0532) 459453

OUR GUARANTEE

- All mail orders are despatched within 24 hours by first-class post.
- Postage and packing is free.
- Faulty cassettes and discs will be replaced immediately.

(This does not affect your statutory rights)